NUTRITION ACTIVITIES

OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES

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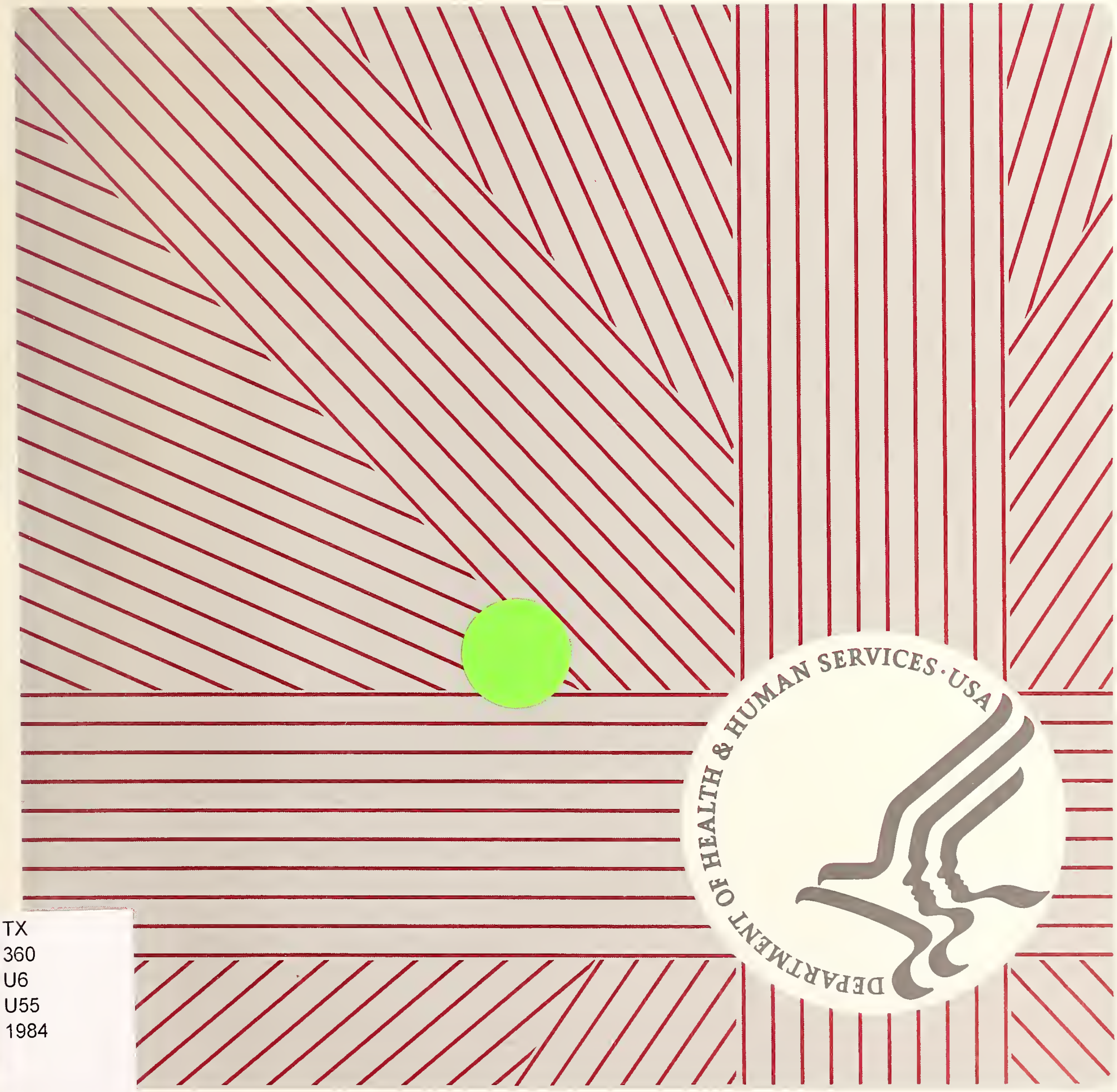

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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Secretary's Preface

One of the major mandates of the Department of Health and Human Services is protecting and promoting the health of the American people. Indeed, this is no small task.

This volume chronicles the vast scope of our nutrition efforts—a major thrust in meeting that mandate. It chronicles substantial contributions in nutrition research, nutrition services, nutrition education, nutrition status monitoring, food safety and quality, and international nutrition concerns.

The release of this report gives me special pleasure because throughout my career as a public servant I have championed the role of nutrition in health and well-being. The science base for these activities has been growing impressively in recent years. For example, the knowledge gleaned from a thoughtful, long term study in Massachusetts—the Framingham Study—has highlighted and dramatized the connection between diet and heart disease, and has helped to facilitate changes which we believe can and will enhance the health of Americans. And just last year, our sponsorship of the report on *Diet, Nutrition and Cancer* by the National Academy of Sciences, documented an impressive convergence between some of the recommendations which might be offered to reduce the risk of cancer and those for reducing the risk of cardiovascular disease.

Many of these recommendations are already reflected in our report, *Nutrition and Your Health: Dietary Guidelines for Americans*, which provides a solid policy foundation for our many programs in nutrition services and nutrition education. But, as we learn through our science base and our national nutrition monitoring system, we will be able to improve the nature and specificity of the "do's" and "don'ts" for Americans.

This report offers health professionals additional insight into the many and varied activities of DHHS agencies in nutrition. I view these initiatives in a broader perspective—as an overall strategy to accomplish definable goals and objectives in health improvement.

The compilation of these nutrition activities, the accumulation of new research findings which directly link diet to disease and conditions in overall health, the growth of public attitudes and awareness about nutrition which are so encouraging, are all evidence that we are making great strides in enhancing the nutritional and health status of the American people.

Formidable challenges remain. In my view, the speed of our progress on the road to better health for all Americans depends on more public awareness and understanding about nutrition and sound dietary practices. With continued cooperation and collaboration between the nutrition and health communities, and the public and private sector at large, we can and we will meet this challenge.

Margaret M. Heckler

Margaret M. Heckler
Secretary

Foreword

One of the most interesting public health developments in recent years has been the emerging understanding of the relationship between nutritional factors and some of our prominent diseases. Diet is now recognized as a significant factor in four of the ten leading causes of death in America today: heart disease, stroke, cancer and diabetes. The association between diet and cancer has, for example, been the focus of a major study released by the National Academy of Sciences within the past year. It is therefore both appropriate and timely that the Department of Health and Human Services should release this first comprehensive report on its many nutrition activities.

For several years now we have been able to report that Americans are healthier today than at any point in the Nation's history. And though many factors have been involved in these gains, nutritional components have contributed their share. Correlated with improvements with respect to heart disease, stroke and even dental caries, have been impressive shifts in some of the dietary patterns related to those problems.

A variety of Departmental initiatives in nutrition have been implemented as part of our overall strategy to strengthen the nutrition agenda. These include:

- Sponsoring and documenting through our research programs the emerging scientific consensus on the relationships between diet and disease;
- Establishing clinical nutrition research units in academic settings to open new possibilities for human nutrition research;
- Strengthening and improving the coordination of human nutrition research, including the establishment of an Interagency Committee on Human Nutrition Research;
- Designing a National Nutrition Monitoring System, with the Department of Agriculture, to ensure the periodic and systematic assessment of the nutritional status of the American population;
- Identifying basic dietary principles for DHHS information efforts in nutrition, published in *Nutrition and Your Health; Dietary Guidelines for Americans;*
- Establishing a series of specific nutrition objectives to be achieved by 1990 as part of the overall PHS prevention strategy, published in *Promoting Health /Preventing Disease—Objectives for the Nation*;
- Implementing, in concert with the private sector, a special initiative to reduce the level of daily sodium intake among vulnerable segments of the U.S. population,
- Supporting a range of nutrition services within the Department including the implementation of nutritional care plans for individuals along with food service in hospitals, long-term care institutions, child care centers, and meals for older Americans.

These are but a few of the Departmental nutrition priorities, but they provide a measure of the substantial emphasis placed on nutrition by DHHS. This report offers a ready reference of the Department's many and varied initiatives in six areas of nutrition: human nutrition research (Chapter 1); nutrition monitoring (Chapter 2); nutrition education (Chapter 3); nutrition services and manpower (Chapter 4); food safety, quality and regulation (Chapter 5); and international nutrition (Chapter 6). It is our hope that the report will be of interest and benefit to the community of nutrition researchers, educators, practitioners, government officials, agency and Congressional staffers, and private sector units who, like this Department, recognize the importance of nutrition in overall health. With sustained and cooperative effort of the sorts represented in this report, we should see continued enhancements in nutrition's contribution to the health of Americans.

Edward N. Brandt Jr

Edward N. Brandt, Jr., M.D.
Assistant Secretary for Health

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Glossary

AAP —American Academy of Pediatrics

ACYF —Administration on Children, Youth, and Families

ADAMHA —Alcohol, Drug Abuse, and Mental Health Administration

AID —Agency for International Development

AoA —Administration on Aging

BCHS —Bureau of Community Health Services

BHCDA —Bureau of Health Care Delivery and Assistance

BHMORD —Bureau of Health Maintenance Organizations and Resources Development

BHPDS —Bureau of Health Personnel Development and Services

BF —Bureau of Foods

BHPr —Bureau of Health Professions

BMS —Bureau of Medical Services

CDC —Centers for Disease Control

CODEX —Codex Alimentarius Commission

CIC —Consumer Information Center

CNRUs —Clinical Nutrition Research Units

DADHP —Division of Associated and Dental Health Professions

DHEW —U.S. Department of Health, Education, and Welfare (to 1980)

DHHS —U.S. Department of Health and Human Services (1980 to present)

DM —Division of Medicine

DRR —Division of Research Resources

EPSDT —Early and Periodic Screening, Diagnosis, and Treatment

FDA —Food and Drug Administration

HCFA —Health Care Financing Administration

HHANES —Hispanic Health and Nutrition Examination Survey

HRA —Health Resources Administration

HRSA —Health Resources and Services Administration

HSA —Health Services Administration

IHS —Indian Health Service

IUNS —International Union of Nutrition Sciences

JNSE —Joint Nutritional Status Evaluation

JSHNR —Joint Subcommittee on Human Nutrition Research

MCH —Maternal and Child Health

MRFIT —Multiple Risk Factor Intervention Trial

NAS —National Academy of Sciences

NCC —Nutrition Coordinating Committee

NCHS —National Center for Health Statistics

NCI —National Cancer Institute

NCO —Nutrition Coordinating Office

NEI —National Eye Institute

NFCS —Nationwide Food Consumption Survey

NHANES —National Health and Nutrition Examination Survey

NHBPEP —National High Blood Pressure Education Program

NHLBI —National Heart, Lung, and Blood Institute

NIA —National Institute on Aging

NIAAA —National Institute on Alcohol Abuse and Alcoholism

NIADDK —National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases

NIAID —National Institute of Allergy and Infectious Diseases

NICHD —National Institute of Child Health and Human Development

NIDA —National Institute of Drug Abuse

NIDR	—National Institute of Dental Research
NIEHS	—National Institute of Environmental Health Sciences
NIGMS	—National Institute of General Medical Sciences
NIH	—National Institutes of Health
NIMH	—National Institute of Mental Health
NINCDS	—National Institute of Neurological and Communicative Disorders and Stroke
NNMS	—National Nutrition Monitoring System
NRC	—National Research Council
NSSS	—Nutritional Status Surveillance System
NTIS	—National Technical Information Service
OASH	—Office of the Assistant Secretary for Health
ODPHP	—Office of Disease Prevention and Health Promotion
OHDS	—Office of Human Development Services
OIH	—Office of International Health
OSTP	—Office of Science and Technology Policy
PHS	—Public Health Service
RDA	—Recommended Dietary Allowances
SSA	—Social Security Act
TDS	—Total Diet Study
USDA	—U.S. Department of Agriculture
VA	—Veterans Administration
WHO	—World Health Organization
WIC	—Special Supplemental Food Program for Women, Infants and Children

Introduction and Highlights of DHHS Nutrition Activities

The purpose of this report is to provide to health professionals an overview of nutrition programs sponsored by the Department of Health and Human Services (DHHS) and to inform them about recent significant activities. It is recognized that much of the information in the report will also be of interest to others in the private sector, as well as various parts of Congress and the Administration.

As a pilot effort to report to the public, the report is not designed to adhere to a rigid time frame for the nutrition activities described. Many activities were ongoing prior to the period generally covered in the report, and earlier background on some of these is included. Also, because the purpose of this report is primarily informational, there is little distinction made between larger and smaller programs in terms of resource requirements or expenditures.

The early 1980's have proved a dynamic period for DHHS in human nutrition—probably the most dramatic since the 1920's and 1930's, the era of the discovery of most of the essential vitamins and minerals when the foundations of modern nutrition science were built. There have been several major health efforts with nutrition components in the U.S. in the last decade. Research supported by the Department mainly through the National Institutes of Health (NIH) has contributed significantly to these improvements in public health.

One of these advances is the notable decrease in cardiovascular mortality in recent years. Although many factors are thought to be involved in the decrease, dietary changes certainly appear to be important among them. A recent review notes:

> "Cardiovascular mortality has decreased more than 30 percent in the last 30 years, and this decline has accelerated so much that over 60 percent of it has occurred between 1970 and 1980. Among people between 25 and 44 years of age, deaths as a result of heart disease have declined from first to third among all causes but remain the leading cause of death at ages 45 and over. Although male death rates for coronary heart disease exceed those for females, more women than men die from stroke. The decline in cerebrovascular death rates has been even greater than that from coronary heart disease. Moreover, the pattern of decline differs. The decline in stroke began earlier in the century and has accelerated during the past decades. Since 1972, stroke-related deaths have declined by 5 percent a year (over 40 percent) with the greatest decline experienced among black females . . . Positive changes in nutrition habits in recent years are evidenced by decreases in the consumption of cholesterol and saturated fats." (1)

Equally dramatic has been the decline in dental caries in the U.S. in recent years. The National Institute of Dental Research (NIDR) has recently issued its report "The Prevalence of Dental Caries in United States Children, 1979–1980" (2) in which the conclusion is reached that a substantial decrease in caries prevalence in school-age children has occurred between 1971–73 and 1979–1980. Specifically, the average number of decayed, missing, and filled teeth surfaces has decreased from 7.06 to 4.77 per child, or approximately a 32% decrease over an eight year period.

> "On the basis of the available evidence, it appears that the prevalence of dental caries in the United States, as well as several other nations, is declining. This decline is caused primarily by the increasing availability of fluoride intentionally introduced in drinking water and in various systems and topical forms of supplementation. . . . The National Caries Program of the National Institute of Dental Research, established in 1971, set as its goal the elimination of dental caries as a public health problem in the United States. It now appears that this goal may be near attainment. . . ." (3)

These are but two examples of the impact nutrition factors can have on health status. A central mission of the Department of Health and Human Services is fostering the development of new knowledge about nutrition and health and working to ensure its application to the improvement of the public's health. Many

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aspects of DHHS programs are devoted to that mission. Selected highlights follows, with elaboration in later chapters.

Strengthening and Improvement of Nutrition Research Coordination

The Department has sustained its commitment to strengthening nutrition research and substantially improved intra- and interdepartmental coordination of research efforts. Nutrition research was funded at $144,488,000, $150,564,000, and $160,700,000 in FY 79, FY 80, and FY 81, respectively, with the bulk (about 93%) awarded through the NIH. Several other agencies, including the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA), Food and Drug Administration (FDA), Health Resources and Services Administration (HRSA), National Center for Health Statistics (NCHS) and Centers for Disease Control (CDC) also support elements of nutrition research. Since 1977, NIH has expanded its program in nutrition research and research training, and the level of effort has generally been sustained in the other agencies.

Coordination of nutrition research both within the Department and in relation to broader Federal efforts has been strengthened. In December 1980, the Department announced a Nutrition Research Initiative to develop a more comprehensive and effective program of nutrition research and training to support related missions. This initiative is sponsored and coordinated by the NIH and cosponsored by ADAMHA, FDA, CDC, HRSA, and NCHS. The first step in implementation of the initiative was the Conference on Assessment of Nutritional Status held at NIH in September 1981. (4)

Department nutrition research, in turn, is being coordinated with broader Federal efforts, initially through the Joint Subcommittee on Human Nutrition Research (JSHNR) of the Office of Science and Technology Policy (OSTP). The JSHNR was established in September 1978 to ensure that the nutrition research efforts of these Federal agencies are mutually reinforcing. The JSHNR has developed and issued a series of reports under the general title, "Federally-Supported Human Nutrition Research, Training and Education: Update for the 1980's" (5–7). In December 1982 the JSHNR sponsored the first Conference on Federally-Supported Human Nutrition Research. This conference provided the opportunity to share information about the seven Clinical Nutrition Research Units supported by NIH, inhouse NIH nutrition research, FDA biomedical and consumer research, the five USDA research units at the Presidio, Tufts, Baylor, Grand Forks, and Beltsville, the Veterans Administration (VA), the Agency for International Development (AID), and Department of Defense (DoD) nutrition research programs. In 1983 the work of the JSHNR was transferred to a newly established Interagency Committee on Human Nutrition Research (ICHNR), under the leadership of DHHS and USDA.

Establishment of Clinical Nutrition Research Units (CNRUs)

The establishment of seven Clinical Nutrition Research Units (CNRUs) in FY 79 was a creative and imaginative response by the National Institutes of Health (NIH) to a longstanding need to bring clinical nutrition into the mainstream of medical research and practice. The CNRUs have been funded at seven academic centers: University of Chicago, University of Wisconsin, Medical College of Georgia, University of Alabama in Birmingham, Vanderbilt University, Cornell University Medical College Memorial Hospital for Cancer and Applied Diseases, and Columbia University College of Physicians and Surgeons.

Each of the CNRUs has the following components: research with human subjects and populations; laboratory investigations; research training; shared facilities and research services; educational programs for medical students, house staff, practicing physicians, and paramedical personnel; nutritional support services; and public information activities.

The CNRUs are already upgrading the role of clinical nutrition in the institutions where they are situated. Ongoing nutritional research has been strengthened by the support they provide. Training in nutrition has been improved at all levels. Patient care has been enhanced by improved nutrition assessment. The CNRUs program will do a great deal to help clinical nutrition reach its potential in medicine.

Establishment of a National Nutrition Monitoring System (NNMS)

A comprehensive NNMS exists and is in place, with a variety of improvements currently under study. The proposal for the NNMS was submitted to Congress in March 1978 by the DHHS (then DHEW) and the USDA, and a joint plan for its implementation was presented to Congress in October 1981. Under the implementation plan, periodic reports on the nutrition status of the population will be issued to Congress jointly by the two Departments with the first report to be issued in 1984.

Nutrition monitoring consists of a broad range of activities designed to periodically and systematically assess the nutrition status of the American people and the factors that may be affecting it. The NNMS includes assessments of nutrition and dietary status through nationwide surveys and surveillance; continuous updating of data on food composition; research on human nutrition requirements and nutrition assessment methods; regular determinations of the nature of the food supply and its nutrient content; retail foods sales patterns; and studies of public knowledge, attitudes, and preferences concerning foods.

Two surveys constitute the core of the NNMS: the National Health and Nutrition Examination Survey (NHANES) administered by the DHHS, which provides health status and food consumption measurements, and the Nationwide Food Consumption Survey (NFCS) administered by the USDA, which provides food consumption data. Both USDA and DHHS carry out a variety of activities in addition to NHANES and NFCS that make significant contributions to understanding the dietary and nutrition status of Americans including food supply determinations and food composition measurements by USDA, marketplace surveillance, consumer knowledge and attitude surveys by the DHHS, and methodology development by both Departments.

Nutrition assessment with respect to weight and height measurements and hemoglobin and hematocrit determinations is undertaken directly through health service delivery programs (e.g., Maternal and Child Health, (MCH), Community Health Centers, Early Periodic Screening, Diagnosis, and Treatment (EPSDT) and the Special Supplemental Food Program for Women, Infants, and Children (WIC). A Nutritional Status Surveillance System (NSSS) is coordinated by the Centers for Disease Control (CDC) which provides a continuous monitoring of selected indicators of nutritional status of participants in some of these programs and other selected health service delivery programs.

To improve cohesiveness of the system, the DHHS and USDA have efforts underway to coordinate better the NHANES and NFCS surveys and develop a reporting system to translate the findings from these and other Federal monitoring efforts into the periodic reports to Congress.

The NNMS is expected to provide information on a regular basis about the nutrition status of the American population and selected at-risk groups of particular interest. Information will also be provided on the kinds and amounts of food eaten by Americans; shifts in people's concepts about food and in their food preference, both of which necessarily influence food choices; the precise composition of foods eaten, including their content of essential nutrients, types and extent of fortification, and the presence of contaminants that may influence nutritional quality; and the availability of food for consumption, which in turn may be affected by factors such as crop strategies, commodity prices, and support policies.

National Health and Nutrition Examination Survey II

In NHANES II, conducted by the NCHS from 1976 to 1980, 21,000 people from 6 months to 74 years of age were examined, using a nationally representative sample of the civilian noninstitutionalized population. Data from NHANES II will provide the first look at changes in the health and nutrition status of the population over time based on: a general medical examination and screening, a complete medical history, body measurements (height, weight, skinfolds), a 24-hour dietary recall, and numerous laboratory tests on blood, serum, and urine. NHANES II also will provide information on kidney disease, heart disease, hypertension, certain allergies, disc degeneration, pulmonary function, and hearing and speech problems.

Data tapes on the NHANES II nutrient data base, 24-hour food consumption and nutrient and caloric intake, food frequency, and other dietary data and selected nutrition biochemistries have been released through the National Technical Information Service (NTIS). NHANES II documents on blood lead levels, dietary intakes, biochemical assessments, hypertension, and blood carbon monoxide were prepared for publication in 1982.

The Hispanic HANES (HHANES) began in July 1982, and the NHANES III is scheduled for 1987 to 1990. The NHANES III will be similar in design and scope to the NHANES II, thus providing the data needed for monitoring changes in prevalence of health and nutrition problems in at-risk groups over time.

A follow-up study of adults (25–74 years at the time of the study) in the HANES I is under way with leadership by the National Institute on Aging (NIA). The study, which has a nutrition component, is looking at the outcome (health state, death, disease) in these individuals in relation to health and nutrition data collected in HANES I.

Nutritional Status Surveillance System (NSSS)

The NSSS, coordinated by CDC, monitors the nutrition status of high-risk pediatric and pregnant populations, collects data from a variety of nutrition and health programs such as MCH, WIC, EPSDT, and Head Start. The data include readily available measurements such as height, weight, and hemoglobin or hematocrit. These data are rapidly analyzed and compared with data from reference populations, and the information is then passed on to State or local delivery systems for use in planning, managing, and evaluating health programs.

The CDC provides continuing consultation, technical assistance, and statistical services throughout the year to the 31 States participating in the CDC-coordinated NSSS. To improve the accuracy of data collected for nutrition status monitoring, the Health Services Administration (HSA) and the CDC collaborated on developing training materials and conducting three regional training workshops in 1981 emphasizing standard techniques for measuring the growth of children. Physicians, nurses, and nutritionists from 31 States participated in these workshops.

Initiation of Sodium Reduction Program

The DHHS has undertaken the important public health objective of reducing on average the sodium intake level by the U.S. population. Improving the health of the American public through disease prevention and health promotion activities is a fundamental DHHS goal, and reducing sodium intake will contribute to achieving this goal. At present, about 60 million Americans are affected by borderline or high blood pressure. Not all hypertensives are "salt-sensitive," and the precise relationship between sodium consumption and blood pressure is not understood, but many individuals can be helped by reduced sodium intake. Additionally, it is known that the average U.S. daily sodium intake is far in excess of the amount needed for good health.

An active voluntary program begun in 1981 is already providing consumers, through both labeling and consumer education programs, more information about the sodium content of foods. The program also encourages manufacturers to reduce the amount of sodium in processed foods and to offer a greater variety of foods with lower sodium content. The goal is to make available to consumers a wider choice of sodium-modified and sodium-labeled foods so that those who need to follow a low sodium diet, and those who choose to follow one, can do so with substantially greater confidence and ease.

Another part of the program involves sodium labeling regulations proposed by the FDA in June 1982. The regulations would require that sodium be part of the standard nutrition label and would define terms such as "low sodium" and "sodium-free" to ensure consistency in the use of such terms in labeling.

Dietary Guidelines for Americans

In 1980, the DHHS and the USDA for the first time issued joint Dietary Guidelines (8) for the general population, based on the current scientific knowledge concerning the relationship between diet and prevalent nutrition-related diseases. The guidelines continue to provide a solid basis for departmental policies and public recommendations on nutrition. More than seven million copies, including a Spanish edition, have been distributed by the Federal government. The guidelines also have been endorsed, widely utilized, and distributed by the private sector. An interdepartmental committee has been established to reexamine the guidelines in light of emerging scientific evidence concerning the relationship between diet and disease.

Release of Diet, Nutrition, and Cancer Report

In an area of intense public interest, interim dietary guidelines have been suggested to reduce the risk of developing cancer. The National Research Council (NRC), commissioned by the National Cancer Institute

(NCI) of NIH, has conducted a comprehensive study of the scientific information pertaining to the relationship of diet and nutrition to cancer which culminated in the publication of interim dietary guidelines for the public in June 1982 (9). This report indicates that many common cancers are potentially preventable because they appear to be influenced greatly by habit, diet, and custom. The guidelines suggest that Americans eat fruits, vegetables, and whole grain cereal products daily; that they watch their intake of foods high in saturated and unsaturated fats as well as salt-cured or salt-pickled foods; and that they drink alcohol only in moderation. Because data on the possible relationships of diet and cancer are accumulating rapidly, the report advises that guidelines of this sort be reviewed at least every five years.

With the release of the diet, nutrition, and cancer guidelines, an interesting convergence has occurred in scientific recommendations related to the dietary factors that affect cancer and cardiovascular disease. The general dietary guidelines in relation to both diseases are similar, i.e., moderation of calories, total fat, sugar and salt, and increased consumption of fruits, vegetables, and grain products. The emerging scientific consensus conveys considerable implication for Department nutrition activities, and a special interagency task force was established to review the diet, nutrition, and cancer report and consider further Department nutrition initiatives in relation to it.

Health Promotion/Disease Prevention Nutrition Objectives

The Department has recognized nutrition as an essential component of disease prevention and health promotion and has included it as one of the key initatives to improve national health, to improve quality of life, and lower health care costs. The nutrition goals and goals for other areas were described in the first Surgeon General's report on disease prevention. *Healthy People: The Surgeon General's Report on Health Prevention* (10) in 1979, and the strategy for achieving these goals was presented in 1980 in *Promoting Health/Preventing Disease: Objectives for the Nation* (11).

The nutrition objectives include reduction of risk factors related to major diseases including reduced prevalence of overweight, lower serum cholesterol levels, and reduced sodium intake. Increased breast feeding is another objective. They also call for increased public awareness of dietary factors related to disease, increased nutrition labeling of foods, reduction of sodium in processed foods, and improved nutrition surveillance through a comprehensive national nutrition status monitoring system. Implementation of these objectives will involve public and private participants from many sectors and backgrounds, with leadership provided by the DHHS and other parts of government in catalyzing and providing strategic support.

Implementation plans are under development by the DHHS for the nutrition objectives and in some areas efforts are well underway. For example, breast feeding is actively encouraged through MCH programs and is part of the "Healthy Mothers, Healthy Babies" public information program developed by the DHHS. In collaboration with this program, a joint DHHS and USDA Committee on Nutrition Education Material in MCH is working closely with key professional organizations to plan and develop a national program for the promotion of breast feeding. The FDA has been assigned primary responsibility to work with other DHHS agencies for the refinement of the implementation plans and monitoring of the Federal nutrition objectives.

Review of Infant Nutrition

The Department is examining infant nutrition and current feeding practices in the U.S. Two special task forces were convened in 1981 to study the issues relating to the World Health Organization (WHO) International Code of Marketing of Breastmilk Substitutes. One interagency task force is studying the scientific evidence relating to infant and young child feeding in the U.S., particularly in relation to the use of breast milk substitutes. The task force is considering evidence about the nature of the relationship between the use of breast milk substitutes and infant health, trends in breast feeding, particularly the use of breast milk substitutes and the major determinants influencing maternal decisions concerning the choice of feeding. The interdepartmental task force is considering the implications of the WHO Code for the U.S. and developing information about present public and private infant nutrition activities in the U.S.

Infant Formula Act of 1980

This Act, which was signed into law on September 26, 1980, came about primarily because of illness in a significant number of babies caused by ingestion in 1979 of two infant formulas made by one firm which were grossly deficient in the essential nutrient chloride. The act required submission to Congress of reports on infant formula labeling and infant formula export policies; Secretary Schweiker forwarded the reports in July 1981. The act also required that NIH perform long-term follow-up studies on as many of the affected infants as possible; these studies have been underway for over two years and are continuing. The Act required development and implementation of appropriate regulations for infant formulas by the FDA. Five such regulations have been or are being developed: (a) in December 1980 a proposal was issued to ensure production and distribution of infant formulas that contain the necessary nutrients for normal babies; the final regulation was published in April 1982 and is in effect; (b) in January 1981, a proposal was issued specifying recall procedures for removing from the marketplace any defective infant formula product; the final regulation was published in April 1982 and is in effect; (c) a proposal to greatly improve infant formula labeling including improved directions for preparation and use has been developed; (d) a proposal for safe production and distribution of formulas for infants with a variety of illnesses has also been developed; and (e) a review is underway by the FDA in cooperation with the American Academy of Pediatrics (AAP) to reexamine the nutritional composition of infant formulas for normal babies; plans called for issuance of a proposal to further improve nutrient composition in early 1983. When all five regulations are finalized, the Infant Formula Act will be fully implemented.

Need for Applied Nutrition Research

The Department has increasingly recognized and is responding to the need for applied nutrition research in support of future policies and programs. An effort has been initiated to strengthen the DHHS agenda in the area. This research area is very broad, encompassing diverse areas such as behavioral research on dietary habits, adverse effects of food processing, and improved public communication of nutrition messages.

The research needs involve such areas as the interpretation of dietary and nutrition status data, toxicity and bioavailability of nutrients and other substances in foods, the biomedical significance of syndromes associated with use of certain foods or diets, and laboratory methods for broad-scale application in surveys. For example, the NHANES II has provided massive dietary and clinical nutrition status data that require rapid analysis and interpretation for timely application to Department policies such as the health promotion/disease prevention objectives, nutrition services in health programs, and food fortification. Other areas needing study include the mechanisms involved in health problems related to consumption of certain foods or diets, e.g., the etiology of cardiac rhythmicity abnormalities in some individuals consuming the very low calorie diets widely used by the public, and the mechanisms involved in the syndrome observed in infants consuming chloride-deficient infant formulas. Research is also needed to improve the availability of minerals from the food supply. Improved methods to determine the bioavailability of iron would have a positive impact in controlling anemia through food fortification. Improved technology that would result in increased quantities of calcium in foods is needed in view of the incidence of osteoporosis among the older U.S. population.

Introduction of Nutritional Quality in Food Standards

The consideration of nutritional characteristics has been introduced for the first time into international food standards for food quality and safety. The DHHS participated in initial efforts in 1981 to stimulate the consideration of nutritional quality whenever quality standards are developed for foods and food products. The Food Standards Committee of the International Union of Nutrition Sciences (IUNS), in a special workshop partly funded by the DHHS, developed a report on the general principles for introduction of nutrition considerations into the development of food standards and guidelines. It was recommended that all institutions, organizations, or other bodies developing standards or guidelines take nutrition aspects into consideration where appropriate. The report was approved as an official IUNS position document and published in the United Nations University *Food and Nutrition Bulletin.* The report also was submitted to the Codex Alimentarius Commission (CODEX), a United Nations project to establish food standards for international trade, to which the IUNS acts as consultant.

Reduction of Lead and Iodine in Foods

Concern has grown in recent years about whether lead exposure from environmental sources, including food, has resulted in subclinical disease, especially in very young children, who are most susceptible to lead toxicity. Although lead content in foods is regulated on the basis of safety levels it is also of nutrition concern because nutritional factors, including dietary calcium, iron, copper, and ascorbic acid, affect susceptibility to lead toxicity. Substantial reduction was reported in 1981 in the levels of lead in foods, an achievement accomplished through the voluntary cooperative efforts of the FDA and industry. Most of the problems relative to food for infants have been taken care of voluntarily by the manufacturers of infant formulas, evaporated milk, canned infant juices, and glass-packed infant foods. The lead levels in foods for infants are now only ⅕ to ⅒ what they were when the FDA first expressed its concern about these products. Priority interest in 1981–82 has shifted to reduction of lead in other canned foods, especially those, such as juices, that are consumed frequently by young children. The lead content has already been lowered in some of these products.

After a large increase in recent years, the iodine content of the food supply appears to be decreasing to more reasonable levels. This has been accomplished largely through voluntary cooperation of industry with the FDA. The 1974–78 FDA Total Diet Studies (TDS) estimated iodine consumption of adults, infants, and toddlers to be far in excess of the amount recognized as necessary for adequate nutrition, i.e., the Recommended Dietary Allowances (RDA). There are no current reports that document a corresponding increase in the incidence of iodine toxicity or hypersensitivity; however, there is speculation that the higher dietary levels interfere with testing related to thyroid functions, and other effects are speculated. Determination of the iodine content in commodity groups indicated that dairy products were the largest contributors, with most of the remainder coming from grain and cereal products, sugars and adjuncts, and meat, fish, and poultry. The most likely sources of iodine in commodities were identified, e.g., iodine-containing sanitizers of milk equipment and iodophors used as dough conditioners by the baking industry. The cooperation of industry resulted in reducing iodine levels in their products.

DHHS Agencies Involved in Nutrition

The many nutrition activities of the DHHS obviously require resource expenditures, both in terms of manpower and money, in many parts of the Department. Most of the activities are undertaken within the framework of the Public Health Service (PHS). Major organizations with nutrition activities are as follows:

Office of the Secretary (OS)

Office of the Assistant Secretary for Health (OASH)

- Office of the Surgeon General
- Office of the Deputy Assistant Secretary (Disease Prevention and Health Promotion)
    - DHHS Nutrition Policy Board (NPB)
- National Center for Health Statistics (NCHS)
    - Division of Health Examination Statistics
    - Division of Vital Statistics
    - Division of Health Interview Statistics
    - Division of Epidemiology
- Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA)
    - National Institute on Alcohol Abuse and Alcoholism (NIAAA)
    - National Institute on Drug Abuse (NIDA)
    - National Institute of Mental Health (NIMH)
- Centers for Disease Control (CDC)
    - Center for Health Promotion and Education
    - Center for Environmental Health
- Food and Drug Administration (FDA)
    - Bureau of Foods (BF)
- Health Resources and Services Administration (HRSA) *
    - Bureau of Health Professions (BHPr)
    - Bureau of Health Care Delivery and Assistance (BHCDA)
    - Bureau of Health Maintenance Organizations and Resources Development (BHMORD)
    - Indian Health Service (IHS)
- National Institutes of Health (NIH)

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* After September 1, 1982.

  - Office of the Director (NIH Nutrition Coordinating Committee)
  - All 11 Institutes
  - Division of Research Resources
- Health Care Financing Administration (HCFA)
- Office of Human Development Services (OHDS)
  - Administration on Children, Youth and Families (ACYF)
  - Administration on Aging (AoA)

DHHS Nutrition Coordination

The Office of Disease Prevention and Health Promotion, within the Office of the Assistant Secretary for Health, is responsible for coordinating the nutrition activities of the Department. Agencies also have mechanisms for internal coordination of nutrition activities. The Division of Nutrition in the Center for Health Promotion and Education at the CDC, the Division of Health Examination Statistics at the NCHS, and the Office of the Associate Director for Nutrition, and Food Sciences in the Bureau of Foods at the FDA serve as focal points for nutrition activities in these agencies. The HRSA Nutrition Coordinating Committee helps to identify nutrition issues with potential impact on HRSA programs, mobilizes resources to provide coordinated responses and actions by the agency, and undertakes activities on cross-cutting issues with other Federal agencies and outside organizations. The NIH Nutrition Coordinating Committee (NIH–NCC), which operates from the Office of the NIH Director, includes liaison representatives and participants from other PHS components and government departments as well as members from the Institutes and the Division of Research Resources and Research Services. Nutrition research priorities and the NIH programs are reviewed by the NIH–NCC to minimize duplication of effort and identify where research, research training, and research manpower in nutrition need to be advanced.

A Nutrition Policy Board (NPB) also operates within the Department. The Board develops overall nutrition policy for the Department, advises the Secretary and the Assistant Secretary for Health on high-priority issues related to nutrition, and serves as a steering committee for various nutrition programs within the Department. The Board consists of the Deputy Assistant Secretary for Health (Disease Prevention and Health Promotion), who serves as Chairman; the Senior Advisor for Nutrition, who serves as Secretary; and policy representatives from the major DHHS agencies. This report is organized on the basis of the areas represented by the six Standing Committees of the NPB, which are:

- Human Nutrition Research and Research Training
- Nutrition Monitoring
- Nutrition Education
- Nutrition Services and Manpower
- Food Safety, Quality, and Regulation
- International Nutrition

References

1.–Levy, R.I. and Moskowitz, J. Cardiovascular research: decades of progress, a decade of promise. *Science* 217:121–129 (1982).

2.–The Prevalence of Dental caries in United States Children. DHHS Publication No. (NIH) 82–2245. 159 pages.

3.–Leverett, D.H. Fluorides and the changing prevalence of dental caries. *Science* 217:26–29 (1982).

4.–Assessment of Nutritional Status. *American Journal of Clinical Nutrition.* Supplement. 35:1089–1325 (1982).

5.–Joint Subcommittee on Human Nutrition Research of the Office of Science and Technology Policy. Federally-Supported Human Nutrition Research, Training, and Education: Update for the 1980s. I. Human Nutrition Research and Training. December 1980.

6.–Joint Subcommittee on Human Nutrition Research of the Office of Science and Technology Policy. Federally-Supported Human Nutrition Research, Training, and Education: Update for the 1980s. II. International Human Nutrition Research. June 1982.

7.–Joint Subcommittee on Human Nutrition Research of the Office of Science and Technology Policy. Federally-Supported Human Nutrition Research, Training, and Education: Update for the 1980s. III. Nutrition Education of Professionals and the Public. June 1982.

8.–Nutrition and Your Health: Dietary Guidelines for Americans. 1980. USDA/DHHS Publication. USDA Home and Garden Bulletin No. 232. 20 pages.

9.–National Research Council, Committee on Diet, Nutrition, and Cancer. Diet, Nutrition, and Cancer. National Academy Press, Washington, D.C. 20418. 1982.

10.–Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention. DHEW Publication No. (PHS) 79–55071. 177 pages.

11.–Promoting Health/Preventing Disease: Objectives for the Nation. DHHS Publication (PHS). Fall 1980. 102 pages.

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CHAPTER 1

Human Nutrition Research

Human nutrition research in the Department of Health and Human Services is carried out under the general authority of the Public Health Service Act (Sec. 301), which states: "The Secretary (of the DHHS) shall conduct and may support through grants and contracts research and studies on human nutrition, with particular emphasis on the role of nutrition in the prevention and treatment of disease and on the maintenance and promotion of health, and programs for the dissemination of information respecting human nutrition to health professionals and the public."

The definition of human nutrition offered by the Joint Subcommittee on Human Nutrition Research (JSHNR) (1), and its successor Interagency Committee on Human Nutrition Research (ICHNR), provides a useful framework to discuss the nutrition research activities of the DHHS. It is used by all participating agencies within the Federal government for data retrieval and represents a basis for further coordination of Federal programs concerned with human nutrition research.

The ICHNR defines human nutrition research as the pursuit of new knowledge to improve the understanding of nutrition as it relates to human health and disease. It encompasses studies in three major areas: biomedical and behavioral sciences, food sciences, and nutrition education.

Biomedical and Behavioral Sciences: Studies in the biomedical and behavioral sciences aspect of human nutrition research include the consequences of food or nutrient intake and its utilization by the intact organism (animal model or human being), and the metabolic and behavioral mechanisms involved. Included are investigations of nutrient variables at the cellular and subcellular levels, dietary and nutritional studies expected to produce significant changes in the health status of humans, studies designed to explain the metabolic role or function of nutrients in humans and in relevant animal models, studies concerned with genetic-nutrient-environmental interactions in humans where a nutrient is an experimental variable, and studies of the interaction of diets and nutrients with man-made or naturally occurring toxic materials (including drugs and carcinogens).

Food Sciences: Studies in the food sciences aspects of human nutrition research are primarily concerned with the nutritional quality, content, or composition of foods, or with the bioavailability of nutrients in foods. Food sciences research includes studies on the nutritional characteristics of human foods and diets as influenced by varietal and species differences, harvest and post-harvest technology, food processing, transportation, and retail food practices. It also includes studies on methods to improve speed and accuracy in the analysis of nutritionally important food components.

Nutrition Education: Research in nutrition education includes studies of dietary practices, food consumption patterns, and their determinants; and studies on methods for informing and educating the public about nutrition, health and dietary practices.

Human Nutrition Research in Specific Agencies

Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA)

Through its constituent institutes—the National Institute of Mental Health (NIMH), National Institute on Drug Abuse (NIDA) and National Institute on Alcohol Abuse and Alcoholism (NIAAA)—ADAMHA funds intramural and extramural studies to assess biological and behavioral factors related to such eating disorders as obesity, anorexia nervosa, and uncontrollable excessive eating (bulimia). Research studies concerned with the relationship of nutrition to brain development and function, drug abuse and nutrition status, problems of secondary malnutrition in alcoholics, and the mechanism of the fetal alcohol syndrome are also supported by ADAMHA. Studies of the effects of malnutrition on the cognitive processes, as well as the effects of various nutrients (e.g., sucrose) on hyperactivity in children, are also supported.

Centers for Disease Control (CDC)

In recent years CDC has conducted methodological research related to nutrition status monitoring and surveillance, as part of cooperative endeavors with selected State and local agencies to develop a Nutritional Status Surveillance System (fully explained in Chapter 2). The research has focused on developing improved methods to assess nutritional status in population groups, particularly low-income populations at risk for nutrition problems. The CDC Clinical Chemistry Division monitors quality control of assessment methods and develops new or improved methods to use in surveys, including the National Health and Nutrition Examination Surveys.

Food and Drug Administration (FDA)

Nutrition research at the FDA includes some basic biological research on the mechanisms of nutritional problems, but most FDA nutrition research is applied and mission-oriented. It is designed to help the Agency fulfill its statutory responsibilities to ensure the safety, quality, and accurate labeling of foods and food additives.

The following are areas of current FDA research:

Assessment of the Nutritional Quality of the Food Supply: Continuing assessment is needed to assure that food and dietary changes which occur with the introduction of new processed foods do not lead to deterioration of the nutritional quality of our food supply. Much of the FDA's research is designed to contribute to the scientific data base required to assess the scope and significance of these changes and to formulate nutrition policies in areas such as nutrient fortification, food safety, and nutrition labeling.

Toxic Products of Nutrients Resulting From Food Processing: Food processing may convert some nutrients or food components into potentially toxic compounds. FDA is conducting research on cholesterol oxides and *trans*-fatty acids in processed foods to determine the effects of these compounds and to identify other potentially harmful substances.

Factors Affecting Bioavailability: FDA research has focused on the development of *in vivo* models for predicting the biological quality of new fabricated foods and determining changes in bioavailability with changes in food components; for example, the effect of fabricated soy products on utilization of vitamins and the effect of amino acid supplementation on utilization of minerals. Collaborative studies are underway concerning the bioavailability of iron in soy-based products and the presence of proteinase inhibitors in plant protein products. Interactions within groups of minerals have been studied for effects of imbalance through the use of animal models.

Assessment of Sufficiency of the Food Supply: The continuing rapid changes in the food supply require monitoring by the FDA to assess nutritional sufficiency and to provide a scientific data base for food fortification policy. Data bases on food composition and eating practices, nutrient intake, and nutrition and health status of population groups are monitored and analyzed by the FDA. The analysis currently underway of the NHANES II data relative to an overall review of the fortification policy (for cereal grain products) is exemplary of research activities utilizing such data bases. Nutritional anemia is a recognized public health concern in some populations in this country. the FDA is analyzing completed research on several issues relative to iron nutrition, including: the effects of iron fortification in populations at risk of iron deficiency and iron overload; response to iron supplementation by black children vs. white children; and the relationship of iron deficiency to mental performance in preschool children.

Methodological Research: New and improved methodology is needed for the analysis of nutrients and metabolites in foods for support of research and regulatory activities. Current FDA research includes chemical methods for vitamin analysis to replace bioassays presently used, improved instrument analysis for determining minerals, and alternatives to the Protein Efficiency Ratio (PER) for determining protein quality. The FDA also has international collaborative studies for developing and approving Association of Official Analytical Chemists (AOAC) methods to determine dietary fiber in foods as well as improving the current AOAC methods for numerous nutrients.

Acute and Chronic Toxicity of Essential Nutrients: Toxic effects of some nutrients in animals have been reported, but there is an enormous lack of information in this area of research. Research is being undertaken to develop biochemical and physiological indicators of acute and chronic toxic effects for nutrients, and to establish the lowest levels that pose a health concern. This will improve evaluation of potential toxic effects of excess nutrients in the food supply, as well as the appropriateness of claimed benefits from high-potency nutrients.

Health Resources and Services Administration (HRSA)

Two bureaus of the HRSA have research activities. The Bureau of Health Care Delivery and Assistance administers the Title V Maternal and Child Health (MCH) Program which supports investigator-initiated nutrition research projects that respond to health service needs of mothers and children and are primarily designed to help meet the critical need for improved quality, efficiency, and economy in the health care delivery system. Research directions are periodically evaluated, and priorities are reordered to reflect current needs. Findings from the MCH and Crippled Children's Research Grants Program contribute substantially to the advancement of maternal and child health services. Some studies provide a scientific base for health professionals to use in program development, such as guidelines on perinatal nutrition for use by perinatal care centers, and on nutrition status of functionally retarded children for programs serving multiply handicapped children. Others provide technical information that health professionals can use in nutrition education and dietary counseling services. (2, 3)

Several human nutrition studies have been completed in the Indian Health Service, including studies on Navajo women during and after pregnacy (which has revealed inadequate dietary intakes and unacceptable serum levels of key nutrients), studies of visual performance as related to vitamin A intake, and the nutrition status of preschool children throughout the Navajo area.

National Institutes of Health (NIH)

The NIH supports most of the nutrition research in the prevention and treatment of disease. In fiscal year 1981 the Institutes awarded 93 percent of DHHS funds available for nutrition research, manpower development, training, and education.

The nutrition research program at NIH is supported by the eleven Institutes and the Division of Research Resources, and is coordinated by the NIH Nutrition Coordinating Committee in the office of the Director. The program supports research and research training in nutrition as it relates to health maintenance, human development throughout the life cycle, disease prevention, and disease treatment.

The research programs of the Division of Research Resources and the 11 Institutes are described as follows:

Division of Research Resources (DRR). The DRR supplies the resources for many of the research projects planned by the other Institutes in its General Clinical Research Centers (GCRC) program. Seventy-five Centers were supported in the United States in fiscal year 1980. The research beds, laboratories, professional nursing staff, and dietary personnel are essential to clinical investigation in nutrition. The Centers conduct clinical nutrition studies on obesity, diabetes, cancer, parenteral nutrition, hyperlipidemias, atherosclerosis, vitamins, and environmental health factors. The total number of dietary support personnel in the Centers is 245 full-time equivalent employees. The Centers also train 800 interns per year. Several of the 43 clinical associate physicians currently funded in the Centers are directly involved in clinical nutrition research. The team approach in these investigations allows basic scientists, clinicians, dietitians, and nurses to interact in developing systematic methods for nutrition research.

National Institute on Aging (NIA). The NIA supports research on the effects of specific diseases, therapeutic agents, and medical procedures on the nutritional status of the elderly. Investigations on the effects of aging on nutrient utilization and the relationship to nutrient requirements consider factors regulating age-related changes in lean body mass, energy balance and other metabolic processes, and immune function. Another area of research interest is the relation of nutrition to age-related mental deterioration or senile dementia with subsequent loss of neural function, and to the decline in the sensations of taste and smell, as well as to motor coordination and cognition.

National Institute of Allergy and Infectious Diseases (NIAID). The nutrition priorities of the NIAID include the following studies: definition of the relationship of food allergies and the immune response to ingested antigens, and research on orally induced immunologic response to proteins; determination of the modulating effect of specific nutrients (e.g., vitamins, trace minerals, amino acids, and fatty acids) on basic immune functions; study of the modulating effect of malnutrition on resistance to tropical infections (especially infectious diarrheas), the role of breast milk in defense against enteric infections, and the effect of infections on nutritional status; and research on the role of minerals, especially iron, on the metabolism and virulence of fungi and bacteria.

An additional priority—a study of the interaction between nutrition and infection in American hospitals—is part of the NIAID's overall research program on hospital-associated infections. Included in this priority area are epidemiological studies of hospital-acquired infections and malnutrition in different clinical situations; research on the effect of hypercatabolic illness on immune function and resistance to infections; and studies on the effect of enteral and parenteral nutrition support on immune function and hospital infections.

National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases (NIADDK). The NIADDK has research priorities in several areas of nutrition. Human nutritional requirements and the factors that influence them is one priority research area. Nutrients of particular concern are the trace minerals, certain vitamins, dietary fiber, essential amino acids, and total protein. Immediate research goals are to determine the range of safe levels for those nutrients suspected of being involved in dietary inadequacies, imbalances, or toxicities. The use of new technologies in the study of the function of nutrients and their role in disease etiology is another research priority. Recent technological advances (including mass spectrometry, high pressure liquid chromatography, and radioimmunoassy) should permit rapid progress in basic nutrition studies.

Iron deficiency anemia can occur in any population group. NIADDK studies are concerned with better evaluation of the detrimental effects of iron deficiency, including work capacity and performance, physical and mental development and function, susceptibility of infection, and perinatal morbidity and mortality. In the area of trace elements, NIADDK research concentrates on the development of accurate, rapid, and reliable analytical methods. Other studies emphasize the metabolic role of the different trace mineral elements and the range of their quantitative requirements. Interactions among trace elements and between specific trace elements and other nutrients receive special attention.

Research also is being conducted on the chemical characterization of dietary fiber, its physiological effects and the development of improved routine methods for analysis of dietary fiber components. The interaction of nutrition, immune competence, and infection is receiving attention at the request of the U.S.-Japan Malnutrition Panel. The extent to which malnutrition interferes with, or augments, host defense will be be better defined from this research.

Obesity is closely related to the increased incidence of several disease conditions. The underlying, fundamental cause of most obesity remains obscure, and most control measures used to date have failed. The goal of NIADDK research is both to identify the physiologic sequelae of obesity and to prevent obesity with programs based on an understanding of the relationships between genetic predisposition, induced metabolic changes, environmental factors, and life styles that result in obesity.

In the area of nutrition support of hospitalized patients, the NIADDK research efforts are aimed toward the development of improved methodologies for nutrition status assessment and more complete information about the effects of disease states on the nutritional needs of patients. The goal is to develop rapid, improved systems for assessing nutrition status that involve automated assays on small-volume samples of blood and urine for vitamins, trace elements, and electrolytes.

National Cancer Institute (NCI). The NCI is the lead Federal agency for cancer research and control. To speed the widespread applications of research results, the National Cancer Act of 1971 authorized a cancer control program to communicate to the medical community and the public the latest advances in cancer prevention and management. The NCI awards grants for epidemiologic and related surveys, cancer control, cancer centers, construction, conferences, and training. Nutrition research is a large component of the NCI's major programs in cancer epidemiology and includes nutrition epidemiology and the potential roles of specific nutrients in causing and preventing cancer. The NCI's Diet, Nutrition, and Cancer Program (DNCP) supports numerous research projects to elucidate the nature and mechanism of action of known and suspected carcinogens in the food cycle as well as substances with anticancer properties, e.g., vitamins A (and its synthetic analogs), B_6, B_{12}, C and E, and folic acid and selenium. The absence or excess of these and other nutrients is being studied for their effect on cellular differentiation, function, and transformation; various retinoids (synthetic derivatives of vitamin A) are being studied for their potential in preventing epithelial tumors of the bladder, lungs, uterine, cervix, and breast. The NCI also supports efforts to define and improve methods to assess the nutrition status of patients, especially cancer patients, and to develop appropriate parenteral and enteral nutrition support of patients undergoing surgery, chemotherapy, or radiation therapy. Preliminary results from these studies and critical analyses of existing information and future research directions can be found in the reports of the NCI workshops, "Nutritional Support of Patients: Research Directions for the 80s," and "Workshop on Cancer."(4, 5)

National Institute of Child Health and Human Development (NICHD). The NICHD recognizes certain goals as preeminent: ensuring the birth of healthy babies through investigations on maternal and child nutrition, normal and abnormal fetal development, and problems of pregnancy; and providing all children the opportunity for productive and healthy adulthood through research to prevent problems such as obesity and smoking in childhood.

The Institute has the following nutrition research priorities: the relationship of nutrition to reproduction; maternal and fetal nutrition; nutrition during infancy, childhood, and adolescence; behavioral and cultural aspects of nutrition; obesity and the nutritional antecedents of adult disease; nutritional aspects of developmental gastroenterology; and assessment of nutrition status.

National Institute of Dental Research (NIDR). The NIDR conducts and supports research on the relationship between diet and diseases such as dental caries and periodontal disease, as well as on the role of nutrition in the development of soft and hard tissues of the mouth and face. The role of sound nutrition as a preventive measure and the effect of nutritional deficiencies on tooth decay are areas of particular research interest. The National Caries Program, a research and development effort started in 1971 and aimed at reducing the incidence of dental caries, has focused on determining the cariogenic potential of various foods, developing noncariogenic sweeteners and special diets to reduce caries, and the use of fluoride as an effective means to prevent caries. NIDR also conducts studies in health education and motivation and supports research on the role of poor nutrition as an etiologic factor in oral disease.

National Institute of Environmental Health Sciences (NIEHS). The NIEHS supports studies on the interactions between environmental contaminants and dietary constituents in biological systems and the alteration of these systems to prevent biological insults through decreased absorption or enhanced excretion. Research on food toxicology examines the uptake, metabolism, and accumulation of natural toxicants in food crops and plants as well as acquired toxicants generated under suboptimal storage conditions. The hazards of food processing are also studied, especially the toxic properties of food additives and the ways in which they are altered in food and transformed by biological systems.

National Eye Institute (NEI). The NEI's priorities in nutrition are in the treatment of ocular diseases and disorders with vitamins. Studies include research on the basic mechanism of action of vitamin A in vision; on the protective role of vitamin E against induced retinopathies, particularly retrolental fibroplasia; on the effects of nutrients other than vitamin A on normal and pathological visual processes; and on gyrate atrophy, an inborn error of metabolism identified as a deficiency of the enzyme ornithine aminotransferase.

National Institute of General Medical Sciences (NIGMS). The NIGMS conducts an extramural research program to develop better understanding of the biochemical and physiological changes induced by trauma, and the fundamental nutritional aspects of wound healing and biological repair. The Trauma and Burn Program supports research on the nutritional aspects of severe trauma and sepsis, on parenteral protein-sparing therapy, on branched-chain amino acid feeding during injury, on cellular response in shock, on the nutritional requirements of burn victims and on the treatment of posttrauma infections.

National Heart, Lung, and Blood Institute (NHLBI). The NHLBI has several priorities in nutrition research: studies on the role of nutrition in arteriosclerosis; the operation of the Arteriosclerosis Specialized Centers of Research; continuation of community-based media intensive education field trials for cardiovascular health; basic and clinical research at the Research and Development Center for Heart and Vascular Disease; studies on the nutritional aspects of lipid diseases, conducted at the Lipid Research Clinics; research on dietary intervention through the Multiple Risk Factor Intervention Trial; the development of comprehensive tables of food composition; studies on the alteration of diet through behavioral modification; investigations concerning the effects of diet on the metabolism, structure, composition, and blood levels of high-density lipoproteins and other lipoproteins; the implementation of heart attack prevention through nutrition counseling; the determination of nutrient composition of foods; studies on the effects of maternal nutrition on infantile respiratory distress syndrome; and research concerning the role of nutrition in hypertension.

National Institute of Neurological and Communicative Disorders and Stroke (NINCDS). The NINCDS supports and conducts research to clarify the interaction between nutrient intake and activity of the central nervous system. Specific projects are focused on behavioral and neural factors that control food intake, the influence of nutrients on the onset or progress of neurological disorders, the metabolic effects of nutrients on metabolic disorders that cause neurological abnormalities, the transport of nutrients and their metabolic products across the blood-brain and blood-cerebrospinal fluid barriers, and the peripheral effects of drugs used in central nervous system disorders on the intake and utilization of nutrients.

National Center for Health Statistics (NCHS)

The most recent National Health and Nutrition Examination Survey (NHANES) (fully described in Chapter 2) conducted by the NCHS was completed in 1980 and provides the first opportunity to assess changes in the health and nutrition status of the population over time. The nutrition component of NHANES develops data for assessing the nutrition status of a nationwide probability sample, using biochemical, anthropometric, and clinical measurements, and dietary interviews. The FDA, the HRSA, and other Federal agencies concerned with health and health care delivery use studies like NHANES as basic tools for developing reasonable action programs. These studies are at the core of the National Nutrition Monitoring System.

Future Directions for Human Nutrition Research

The Joint Subcommittee on Human Nutrition Research (JSHNR), representing Federal agencies responsible for human nutrition research, identified the following as critical goals in human nutrition research for the 1980's. (6)

- There is need to determine the food and nutrition requirements for maintaining health throughout the life cycle and for preventing and treating diseases, particularly chronic degenerative diseases.

- Improved methods are needed to assess dietary and nutrition status and monitor populations.
- The interactions of nutrients with each other and with other ingested substances, including drugs and alcohol, require elucidation, and better methods are needed to determine nutrient toxicity.
- More knowledge is needed of the safety, quality, and nutritional value of foods, diets, and the national food supply.
- Research training and research manpower development in the biomedical and behavioral aspects of nutrition and in food sciences should be expanded.
- Programs in nutrition education for professionals should be developed, and nutrition education research programs and public education and information programs on nutrition should be expanded.
- International collaborative research efforts with both developed and less developed countries should be expanded.

During the past decade, the science of nutrition advanced rapidly in the areas of epidemiology, animal models of human disease, and clinical investigation. These advances were spurred by developments in molecular biology, genetics, biomedical engineering, physiology, biochemistry, and other basic disciplines. In the coming decade, achievement of the research goals identified by the JSHNR and carried forward by the ICHNR will allow the field of nutrition to reach maturity both as a science and as a clinical specialty. The dividends in better health for all Americans will more than justify the effort and expense.

References

1.–Joint Subcommittee on Human Nutrition Research of the Office of Science and Technology Policy. Federally-Supported Human Nutrition Research, Training, and Education: Update for the 1980s. I. Human Nutrition Research and Training, p. 5, December 1980.

2.–National Research Council, Food and Nutrition Board. Nutrition Services in Perinatal Care. National Academy Press, Washington, D.C., 1981.

3.–National Research Council, Food and Nutrition Board, Commission on Life Sciences. Alternative Dietary Practices and Nutritional Abuses in Pregnancy. National Academy Press, Washington, D.C., 1982.

4.–Workshop on Nutritional Support of the Patient: Research Directions for the 1980s. *American Journal of Clinical Nutrition,* Suppl. Vol. 34, No. 6, June 1981.

5.–The Nutrition of the Cancer Patient. *Cancer Treatment Reports,* Suppl. 5, Vol. 65, 1981.

6.–Joint Subcommittee on Human Nutrition Research of the Office of Science and Technology Policy. Federally-Supported Human Nutrition Research, Training, and Education: Update for the 1980s. I. Human Nutrition Research and Training, p. 27, December 1980.

CHAPTER 2

Nutrition Monitoring

In March 1978 the Department of Health and Human Services (DHHS, then DHEW) and the U.S. Department of Agriculture (USDA), in response to a Congressional mandate, submitted a proposal to establish a comprehensive nutrition status monitoring system with the following goals.

- Provide the scientific foundation for maintaining and improving the nutritional status of the U.S. population and the nutritional quality and healthfulness of the national food supply.
- Collect, analyze, and disseminate timely data on the nutritional and dietary status of the U.S. population, the nutritional quality of the food supply, food consumption patterns, and consumer knowledge and attitudes concerning nutrition.
- Identify high-risk groups and geographic areas, as well as nutrition-related problems and trends, in order to facilitate prompt intervention.
- Establish national baseline data and develop and improve uniform standards, methods, criteria, policies, and procedures for nutrition monitoring.
- Provide data for evaluating changes in agricultural policy related to food production, processing, and distribution that may affect the nutritional quality of the U.S. food supply.

Congress instructed the two Departments to develop a plan for implementing the proposal. In October 1981 the DHHS and the USDA submitted to Congress an Implementation Plan for a National Nutrition Monitoring System (NNMS).

Nutrition monitoring consists of a broad range of activities designed to assess periodically and systematically the nutrition status of the American people and the factors that may be affecting it. The NNMS includes assessments of nutrition and dietary status through nationwide surveys and surveillance, continuous updating of data on food composition, and research on human nutrition requirements and nutrition assessment methods, regular determinations of the nature of the food supply and its nutrient content, retail food sales patterns, and studies of public knowledge, attitudes, and preferences concerning foods.

The NNMS is expected to provide information on a regular basis about nutrition status and about the kinds and amounts of food eaten by Americans; shifts in people's concepts about food and in their food preference, both of which necessarily influence food choices; the precise composition of foods eaten, including their content of essential nutrients, types and extent of fortification, and the presence of contaminants that may influence nutritional quality; and the availability of food for consumption, which in turn may be affected by factors such as crop strategies, commodity prices, and support policies.

Two surveys constitute the core of the NNMS: the National Health and Nutrition Examination Survey (NHANES) administered by the DHHS and the Nationwide Food Consumption Survey (NFCS) administered by the USDA.

There are three important limitations on the proposed NNMS. First, a system designed to provide systematic and reliable information over time about factors important to the nutrition status of Americans cannot provide definitive answers on the impact of nutrition intervention programs. Feeding programs—such as meals for the aged; food supplements for women, infants, and children; and food stamps—are offered to diverse populations that often are changing in other respects. Unless such programs are designed as carefully controlled experiments from the outset, efforts to evaluate them will be frustrated by the presence of a large number of intervening variables that confound the interpretation of data.

Second, cross-sectional periodic national probability surveys cannot provide representative local data for a vast majority of areas, nor can they address rare conditions (less than 1 or 2 percent) with acceptable levels of precision. Finally, caution must be used in extrapolating the results obtained from the study of selected population groups to larger populations.

Nutrition Monitoring Activities in Specific Agencies

Centers for Disease Control (CDC)

The Division of Nutrition of the CDC's Center for Health Promotion and Education contributes to the National Nutrition Monitoring System with a nutrition surveillance program called the Nutritional Status Surveillance System (NSSS). The system monitors the nutrition status of high-risk pediatric and pregnant populations by collecting readily available measurements such as height, weight, and hemoglobin or hematocrit. The NSSS provides data on the prevalence of major nutrition problems in the targeted groups, using information from service delivery programs operated by selected State and metropolitan health jurisdictions. The composition of the groups under study is determined by socioeconomic status, proximity to a nonprivate outpatient clinic, and the selection of certain State health departments to cooperate with the CDC program in obtaining and using nutrition-related data.

The CDC publishes an annual report entitled *Nutrition Surveillance* which contains nutrition-related data collected by State and local health departments from a variety of nutrition and health programs, such as Maternal and Child Health services, the Special Supplemental Food Program for Women, Infants and Children (WIC), Early Periodic Screening, Diagnosis, and Treatment (EPSDT), and Head Start. Monthly and quarterly tabulations and reports are made available to participating clinics for use in assessing the prevalence of nutrition problems, identifying sudden changes in the prevalence and nature of these problems, and identifying technical and management problems related to health care delivery. Annual special analyses and tabulations are prepared in collaboration with the States to help them in program planning and resource allocation.

The CDC nutrition monitoring activities include:

Nutritional States Surveillance System (NSSS): The system encompassed about 2,000 service delivery clinics and furnished data from about 1,000,000 screening and follow up visits annually. A total of 31 states have now implemented nutrition surveillance mechanisms.

Pregnancy Nutrition Surveillance: This component of the surveillance system monitors the prevalence of common nutrition-related problems in high-risk prenatal populations. At the close of 1982 pregnancy nutrition surveillance was underway in 21 States, an increase of three over the previous year. Data reports and tabulations are provided quarterly.

Technology Transfer and Training Materials: Consultation and materials were furnished to participating States to enable them to start and effectively manage their own nutrition surveillance programs. Items included coding instructions; computer system specifications; computer software; guidelines for interpreting surveillance data for planning, control, and evaluation; and training materials.

Training Workshop: Three workshops to train selected State health agency leaders in nutrition assessment, especially the measurement of physical growth in children, were conducted in 1981 at three universities: University of North Carolina, Case Western Reserve University, and University of Washington. The workshops, co-sponsored by the CDC and the Health Services Administration, were attended by representatives from 25 States.

Sentinel Sites: In 1980 CDC awarded a three-year contract to the Detroit City Health Department to establish a nutrition surveillance "sentinel site" in a representative low-income inner-city area. The site has provided quality information continuously on the prevalence of nutrition-related problems among the residents. The site can also provide early warning of potential nutrition problems and can facilitate targeting of resources, measurement of service quality, establishment of priorities, and evaluation of programs. Other sentinel sites in selected urban and rural areas are expected to be added.

Local Assessment Survey: The Local Assessment Survey, designed to provide reliable background data on the prevalence of major nutrition problems in selected communities participating in the CDC-Coordinated NSSS, moved closer to implementation. Arrangements were made to enable the Association of Schools of Public Health to conduct the survey in one of the communities. The survey will allow estimation of: the prevalence of major nutrition problems in representative samples of nutritionally at-risk children living in selected areas, the accuracy of the surveillance data in describing the nature and extent of measurement error, and the prevalence of unserved eligibles in the community. The Survey is expected to start in the spring of 1983.

Hematology References: Reference curves and subroutines to compute hemoglobin and hematocrit indexes were developed from the NHANES I survey conducted by the NCHS. These curves will be applied in the editing and analysis of pediatric and prenatal nutrition surveillance data, and as data become available from NHANES II they will be used to refine these curves. Using reference curves instead of currently accepted cutoffs will provide more realistic estimates of the prevalence of anemia.

Survey Methodology Manuals: Work continued on a series of five manuals describing basic field methodology for conducting nationwide baseline nutrition assessment surveys in developing countries. Final drafts were completed on the first two manuals *(Overview* and *Survey Organization and Administration)* and submitted to the Agency for International Development for approval. The third manual *(Training)* is nearing completion. The CDC and Cornell University are collaborating on the fourth manual *(Survey Sampling).* The last manual *(Analysis of the Survey Data)* is scheduled for completion in 1983.

Support for NHANES Laboratory Assessments: The Division of Clinical Chemistry published *Laboratory Procedures Used by the Clinical Chemistry Division for the NHANES II, 1876–1980.* The report documents the field collection, handling, quality control, and methodologies used for NHANES II biochemical measurements performed at the CDC. The division of Hematology provided NCHS staff with a manuscript for use in publications covering hematological variables. Both reports are essential in interpreting the results of the survey. The two Divisions also have helped plan the laboratory components of the Hispanic Health and Nutrition Examination Survey begun in July 1982. The planning has included methods development, procedures manuals, and quality control systems.

Food and Drug Administration (FDA)

The FDA has monitoring and surveillance activities that provide information about the nutrient composition of foods eaten, food labeling, and public knowledge, attitudes, and preferences concerning foods.

The FDA nutrition monitoring activities include:

Total Diet Study (TDS): FDA annually conducts a TDS to derive average consumption of important components of the diet. The study provides a tracking system for specific indicators of significant changes in the nutritional quality of the national food supply. For example, through this study the FDA has documented the existence of a higher-than-desirable quantity of iodine in the food supply and will continue to monitor the iodine content of the U.S. food supply. Sodium and potassium content are also currently under surveillance. The scientific base for the TDS has been updated using NHANES II and the 1977–78 NFCS data to reflect changes in dietary consumption patterns. The study was converted recently from the measurement of nutrients in 11 (infant/toddler) or 12 (adult) food composites to measurement of nutrients in 234 individual foods representative of the U.S. food supply. Estimates of average nutrient intakes for eight age groups, including infants, toddlers, teenage males and females, adult males and females, and males and females older than 65 years of age, will henceforth be possible. Although analyses are currently limited to eleven selected minerals, it is planned to monitor other nutrients in the future.

Food Label and Package Surveillance Study (FLAPS): FLAPS is a biennial survey of a national probability sample of food products conducted for purposes of tracking sodium labeling, nutrition information, and other information that appears on food labels. The program has allowed the scope and magnitude of food fortification to be better defined, and monitors the percentage of packaged food products with nutrition labeling and the labeling of individual nutrients such as sodium.

Multipurpose Annual Survey of Food Shoppers: Since 1978, the FDA has conducted annual surveys based on a national probability sample of food purchasers to measure public attitudes, knowledge, and practices about food and nutrition and to track changes over time. The survey involves detailed inter-

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views in approximately 1,500 households with individuals primarily responsible for household food purchases (85 percent women, 15 percent men). About half of the survey content is concerned with such matters as opinions about nutrition, food quality, and food regulation. The other half involves new areas of interest or concern to the Bureau of Foods. The current survey primarily concerns knowledge, attitudes, and practices about sodium. Studies of this type permit rapid acquisition of knowledge as to public attitudes and practices relative to food and nutrition, as well as estimates of their concerns and elements of confusion.

Consumer Use of Dietary Supplements: The FDA has completed a survey of a national probability sample to estimate consumer use of dietary supplements, the types of supplements consumed, and the specific consumption patterns. The survey will permit estimates of the contribution that supplements make to dietary status as well as indications of possible injudicious use of high-potency supplements.

Special Studies: Studies to answer specific questions concerning nutrition status are conducted as the need arises. For example, a national survey was conducted in 1978 to estimate the use of protein products in conjunction with weight loss among women ages 20 to 44. The study was part of the total effort to determine nutrition factors related to the death of several young women using very low-calorie protein diets for weight reduction.

Nutrition Surveillance: Surveillance analysis of nutrients in food samples, diet supplements, and other products to determine content of vitamins, minerals, proteins, carbohydrates, and other nutritional components is an ongoing FDA activity. In response to discovery of a chloride-deficient infant formula an intensive survey was made in 1980 of the nutrient content of most infant formula products. An ongoing survey program now is maintained which determines compliance with the nutrient specifications established in the Infant Formula Act of 1980. In addition to the survey analysis activities, new analytical methods have been developed to speed the nutrient analysis and to increase reliability of the methods.

Consumption of Food Substances: National food consumption surveys performed by the USDA or private contractors are used to estimate the consumption of contaminants, toxins, and other substances from foods. Consumption estimates for dietary intakes of substances such as lead, methyl xanthines (caffeine, theobromine, theophylline), animal food drug residues and direct food additives are made for various age groups within the U.S. population. This program provides some of the information needed by the FDA for monitoring the safety of the food supply.

Health Resources and Services Administration (HRSA)

The HRSA's Bureau of Health Care Delivery and Assistance (BHCDA) and Indian Health Service (IHS) participate in nutrition monitoring chiefly through the nutrition screening and assessment provided to clients receiving health care in Maternal and Child Health Programs (MCH), community health centers, and Indian health programs across the Nation. Since 1966 the MCH Program has developed and recommended procedures and guidelines for standardizing nutrition screening and assessment of children and for recording and interpreting clinical data in health care programs. It also provides training for State and local health care providers in nutrition assessment.

The HRSA, together with the CDC, works closely with State and local agencies to help them conduct and improve nutrition assessment and monitoring. Guidelines on prevention, screening, and followup of childhood nutrition disorders have been widely distributed to private and public health care providers by the Division of Maternal and Child Health of the BHCDA.

The HRSA nutrition monitoring activities include:

Training Workshops: Three regional workshops were cosponsored with CDC for State Health agency leadership. Subsequently, State and local workshops were held to train health care providers.

Simplified Materials on Nutrition Screening: HSA developed and disseminated four different simplified materials for use in health care programs to improve the screening and followup of selected nutrition disorders of infants and children. They include a manual and checklist poster for health care providers and leaflets in English and Spanish for parents. (1, 2, 3, 4)

Guidelines/Standards for Health Care Programs: HRSA activity has included development of the following:

Assessing Nutritional Needs of Groups, A Handbook for the Health Care Team which promotes a systematic approach to assessing the nutrition needs of groups was field tested during 1981; *The Preliminary Guide to Quality Assurance in Ambulatory Nutrition Care* was designed to assist health care providers with the certification of continuous, optimal, effective, and efficient health and nutrition care. The latter was field-tested in 1981 and will be published and disseminated to all State health departments, other Federal agencies, and training programs in nutrition.

Percentile Charts of Skinfold Thickness: triceps and subscapular skinfold for boys and girls 2 to 18 years of age, were published by the NCHS. In October 1980 the BCHS convened an advisory group at the request of the NCHS to review these new charts and make suggestions for their dissemination and use. (5, 6)

Nutritional Disorders of Children: a book which focuses on nutritional assessment, has been widely disseminated to health professionals in many disciplines. (7)

National Institutes of Health (NIH)

The NIH has initiated a large number of epidemiological and other types of studies with significant nutrition components. Along with the FDA, the NCHS, and the CDC, the NIH is continuing extensive research to identify and validate more sensitive, specific, and cost-effective methods of characterizing the nutritional and health status of individuals and populations at high risk. Together with the FDA and the USDA, the NIH is working to improve assessment techniques for total body stores of minerals and other essential nutrients and to develop uniform data-recording and other procedures for application to large-scale surveys and program evaluations. The NIH has also supplied funds to the USDA Nutrient Composition Laboratory to develop automated analytic techniques for direct analysis of food and improved methods for collecting, recording, and evaluating dietary data. Current clinical trials and epidemiological studies have provided an opportunity to develop, test, and refine methods for measuring nutrient intake in populations. The NIH, the CDC and the FDA sponsored a conference on the Assessment of Nutritional Status in 1981, proceedings of which have been published in the *American Journal of Clinical Nutrition.* (8)

National Center for Health Statistics (NCHS)

The lead agency in the Federal effort to monitor the overall nutrition status of the public is the NCHS, and the premier NCHS effort in fulfillment of this mandate is the National Health and Nutrition Examination Survey (NHANES). (9) In addition to the periodic NHANES, the NCHS also conducts several other surveys that provide important information for assessing the health effects of nutrition status.

Two NHANES surveys have been completed (NHANES I, 1971–1974; and NHANES II, 1976–1980) and have provided information about a number of nutrition-related conditions including growth retardation, anemia, obesity, heart disease, hypertension, diabetes mellitus, vitamin and mineral deficiency or toxicity, and heavy metal and pesticide exposures. Measurements include physical examinations, anthropometry, blood cell assessments, biochemical analysis of blood and urine, X-rays, functional assessments, and health history.

Extensive information on dietary intake is provided through NHANES. Included is information collected through a 24-hour recall of food consumed and the frequency of consumption of 18 food groups ingested daily or weekly in the individual's usual pattern, as well as analyses of meal patterns that can be related to measures of nutritional status.

NHANES I: The manuscripts relating NHANES I dietary intake data to dental health, anemia, serum cholesterol and urate, body mass index, and blood pressure were completed and should be available in 1983. A manuscript on the prevalence of overweight and obesity was also submitted for early 1983 release.

NHANES II: Data tapes on the nutrient data base, 24-hour food consumption and nutrient and caloric intake, food frequency, other dietary data, and selected nutritional biochemistries have been released through the National Technical Information Service (NTIS). Other data sets will be available soon. Microdata tapes on other substantive areas are in preparation. NHANES II manuscripts on blood lead levels, dietary intake, biochemical assessments, hypertension, and blood carbon monoxide were released in 1982.

Hispanic Health and Nutrition Examination Survey (HHANES): This survey was planned and pilot tested in the Bronx, New York, and Miami, Florida. The content and conduct of the study are similar to NHANES II, but changes include a dental examination and an ultrasound examination for gallstones. The current plans are to examine 8,000 Mexican-Americans in 17 sites in California, Arizona, New Mexico, Texas, and Colorado. The target population is the civilian, noninstitutionalized population aged 6 months through 74 years. The study began July 1982, and is expected to take about 18 months. The study will then cover the New York and Miami areas starting in 1984.

National Natality Survey (NNS); National Fetal Mortality Survey (NFMS): Data collection for these two 1980 surveys was completed. The NNS covered a sample of 10,400 live births with oversampling of infants weighing less than 2,500 grams. The NFMS covered a sample of 6,900 fetal deaths and included information obtained from mothers, physicians, and hospitals. Efforts in 1981 were directed to editing and processing the data. Reports are not expected until 1983. These surveys are supported in part by the Bureau of Health Care Delivery and Assistance of the HRSA.

Child Health Supplement: The questionnaire was administered to a sample of children in the households selected for the 1981 National Health Interview Survey, which typically covers 40,000 households annually. Interviewing was completed in December 1981. Some information on breastfeeding and associated data from this survey will be available in 1982.

National Survey of Family Growth: The survey began in 1982 and will be completed in the first half of 1983. The survey of women of childbearing age includes information on breastfeeding and prenatal care.

Joint Activities in Nutrition Monitoring

The incorporation of NHANES and NFCS into an operational National Nutrition Monitoring System requires two things: achievement of the necessary coordination of the two surveys; and development of an analysis system to merge findings from NHANES, NFCS, and other Federal monitoring efforts.

Better coordination will be realized by the development of a common sampling plan and the maintenance of close cooperation by the directors and technical staffs of the two surveys to make the results of NHANES and NFCS as comparable as possible. Together, these surveys will regularly provide important data on the nutritional health of a national population sample, together with comprehensive information about U.S. food consumption patterns.

Translation of findings into periodic reports to Congress will be realized by developing a reporting and evaluation system under a DHHS–USDA Joint Nutritional Status Evaluation (JNSE) Committee. Members of the Committee will be appointed by the Assistant Secretary for Health (DHHS) and the Assistant Secretary for Food and Consumer Services (USDA). The Committee will develop reports on the nutritional status of the population to be submitted to Congress jointly by the two Departments at 3-year intervals. The first report will be issued in FY 84.

In addition to NHANES and NFCS, the USDA and the DHHS carry out a variety of other linkages that contribute significantly to our understanding of the dietary and nutritional status of Americans. Examples are the Total Diet Study conducted by the Food and Drug Administration (DHHS) and the food supply determinations made by the Human Nutrition Information Service (USDA). The JNSE Committee will evaluate the findings of these efforts and include them in their reports.

The NIH has collaborated with the USDA in two ways: it has underwritten a program in which the USDA acquires certain nutrient data, and it supports analyses for food fatty acids and cholesterol at the USDA Beltsville (Maryland) Human Nutrition Research Center. These activities, with the cooperation of food manufacturers, are looking to the development of an up-to-date comprehensive food table for calculating nutrient intakes.

References

1.–Nutrition Screening of Children: A Manual for Screening and Follow Up. DHHS Publication No. (HSA) 81–5114. 16 pages.

2.–Check Marks for Good Health. DHHS Publication No. (HSA) 81–5115. Poster.

3.–Nutrition Checkups for Children. Tips for Parents. DHHS Publication No. (HSA) 81–5113. 8 pages.

4.–Examines de Nutricion para Ninos. Algunas Sugerencias para las Padres de Familia. DHHS Publication No. (HSA) 81–5116. 8 pages.

5.–Basic Data on Anthropometric Measurements and Angular Measurements of the Hip and Knee. Vital and Health Statistics, Series 11, No. 219. DHHS Publication No. (HSA) 81–1669. 68 pages.

6.–Owen, George M. Measurement, recording and assessment of skinfold thickness in childhood and adolescence: report of a small meeting. *American Journal of Clinical Nutrition.* 35:629–638 (1982).

7.–Nutritional Disorders of Children: Prevention, Screening, and Follow up. DHEW Publication No. (HSA) 78–5104. 123 pages.

8.–Assessment of Nutritional Status. *American Journal of Clinical Nutrition.* Supplement. 35:1089–1325 (1982).

9.–Information about NCHS programs is available from: Scientific and Technical Information Branch, NCHS, 3700 East-West Highway, Room 1-57, Hyattsville, MD 20782.

Chapter 3

Nutrition Education

In carrying out their mandates, agencies of the DHHS have major responsibility to disseminate information linking diet, nutrition status, and health to professionals, the public, and a wide variety of institutions that influence the quality of nutritional care. When major public health issues in nutrition are identified, DHHS agencies may stimulate and/or develop specific educational programs. Nutrition education and training are critical not only for physicians and other health care providers but also for teachers and others involved in public education, especially those who have a direct impact on the dietary habits of children.

In some instances, Congress assigns educational activities to one or more agencies of the Department. In other cases, public health education and information programs are conducted under the Department's broad authority to maintain and enhance the health and well-being of the Nation.

Nutrition Education Activities in Specific Agencies

Departmental activities include:

- The joint DHHS-USDA publication *Nutrition and Your Health: Dietary Guidelines for Americans* was issued in February 1980. (1) The recommendations are intended to help generally healthy people select an adequate, balanced, and moderate diet compatible with maintenance of normal weight and good health.

- The first Surgeon General's report on disease prevention, *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention,* was issued in July 1979.(2) The central theme of the report is that the Nation's health can be significantly improved through individual and group action. It outlines health goals for infants, children, adolescents, adults, and older adults including discussion of the role of nutrition in health promotion and disease prevention.

- A national strategy for further improving the health of Americans was presented in the publication *Promoting Health/Preventing Disease: Objectives for the Nation,* released in the fall of 1980. (3) Specific measurable health objectives in 15 priority areas, including nutrition goals described in *Healthy People,* were outlined.

- The Department, in conjunction with the U.S. Department of Agriculture, the Federal Trade Commission, the White House Office of Science and Technology Policy, and the Society for Nutrition Education, convened a National Conference on Nutrition Education in September 1979. The Conference addressed U.S. nutrition education needs for the next decade, with special emphasis on pregnant women, children, adolescents, low-income populations, the elderly, and persons with diet-related diseases. The proceedings of the Conference were published as a supplement to the *Journal of Nutrition Education* in June 1980. (4)

- The Department completed its first inventory of nutrition information and education programs and publications in January 1979 and updated the inventory in January 1980. Forty-three programs with nutrition components were identified within 9 DHHS organizational units. Major target populations included health professionals, medical students, ethnic groups, teachers, and the general public. Publications intended for the general public were reviewed and evaluated by the Society for Nutrition Education. An annotated bibliography of current DHHS nutrition publications for the public has been developed. (5)

- Joint ventures in developing and disseminating nutrition information have involved DHHS agencies and professional organizations, including the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, and the National Academy of Sciences.

Centers for Disease Control (CDC)

The CDC's Center for Health Promotion and Education provides leadership and direction to a comprehensive national health education program for the prevention of disease, disability, premature death, and unnecessary health problems. The Division develops programs to help health professionals design and evaluate nutrition education activities and provides effective nutrition education materials for patients of health care delivery organizations. Public health agencies and institutions offering adult education programs are encouraged to develop programs to train senior citizens as paraprofessional educators and counselors. The Health Education Division also is identifying and developing valid measures of behavior, attitudes, and knowledge that are amenable to change through educational interventions.

Food and Drug Administration (FDA)

Nutrition information and education are part of FDA programs administrated by the Office of the Associate Director for Nutrition and Food Sciences in the Bureau of Foods, the Office of Consumer Affairs, and the Office of Public Affairs, within the headquarters of the FDA. Field Programs are provided by the Consumer Affairs Officer's educational program through FDA Regional and District Offices. The nutrition education components within these areas are primarily related to the FDA's regulatory mission and are usually directed toward the general public.

The following are some representative current FDA nutrition education activities:

Sodium Awareness Campaign: In April 1981 the FDA announced plans for a campaign to reduce on average the amount of sodium in the American diet and to give consumers more information about the sodium content of the foods they eat. In addition to working with manufacturers to encourage voluntary reduction of sodium in processed food, the FDA began a campaign to educate consumers about the relationship between sodium intake and hypertension and to alert them about sources of sodium in their diets. The public education efforts include publications, public service announcements, media mailings, and the development of a modular television package on sodium for use by local television stations.

The FDA is collaborating extensively with the National High Blood Pressure Education Program (NHBPEP) in an effort to build the agency's sodium message into the NHBPEP's successful and far-reaching network of public education about high blood pressure. The FDA and USDA have jointly developed a publication entitled *"Sodium: Think About It."* (6) In addition, liaison has been established with various private sector groups to encourage their production and distribution of materials about sodium, and the FDA and the NHBPEP have endorsed several privately produced publications.

Food Labeling: Nutrition labeling on food products is the largest source of nutrition information available to the public. It provides point-of-purchase information about individual foods to millions of consumers. Many of FDA's education/information activities are related to various aspects of nutrition labeling. In response to the public health need for more information about sodium, a regulatory proposal has been published to require sodium as part of nutrition labeling and to define terms such as "low sodium" and "reduced sodium." In a continuing effort to improve food labeling information, the FDA has developed several alternative nutrition label formats and is planning to consumer-test their effectiveness in communicating nutrition information as compared with the present format.

Consumer Surveys: The FDA conducts consumer surveys on national probability samples of food shoppers which permit tracking changes in consumer perceptions, knowledge, and purchasing practices. These surveys are used to measure changes over time and to determine how consumers may be influenced by FDA activities such as nutrition labeling.

Nutrition Education Materials: The FDA produces numerous materials on nutrition for the general public, health professionals, and educators. The materials, which include publications, slide shows, tabletop exhibits, and movies, are available through Consumer Affairs Officers in FDA field offices. Many nutrition-related articles appear in the *FDA Consumer* and many of them are reprinted for distribution through the Consumer Information Center (CIC), as well as by the FDA. The FDA provides the CIC with about one of every five publications it distributes, and nutrition information represents a considerable percentage of the titles distributed by the CIC. Four FDA booklets—*Salt, Some Facts and Myths About Vitamins, Sugar,* and *Food Additives*—have been among the publications most frequently requested from the CIC. Through the *Drug Bulletin* medical doctors are kept informed about current issues of public health significance, such as the presence of lead in bonemeal and the risks of low-calorie liquid protein diets. Another example of nutrition education materials for professionals is a self-instructional modular course in applied nutrition for students in the health professions, which has been developed and evaluated and is now being refined.

Nutrition Consultation: Nutrition professionals at the FDA regularly and frequently provide consultation on technical matters to the public, media, and other nongovernmental organizations. They also provide education to the public on nutrition-related subjects through speeches and publications for consumer groups and interviews with the public media. For example, media interviews with FDA officials regarding sodium are part of the agency's program to increase public awareness about sodium.

Consumer Inquiries: The FDA Consumer Communications Office annually receives 60,000 to 70,000 inquiries of which over one-third are for food and nutrition information. Many require preparation of individual responses, while others can be answered by providing FDA brochures, consumer memos, and *FDA Consumer* reprints.

Health Resources and Services Administration (HRSA)

New knowledge emerging in the field of nutrition, including both the science of nutrition and the process of nutrition service delivery, is useful when applied through the provision of nutrition services. Keeping health care providers informed of current research findings and of strategies for implementing these finding in the health service delivery system is a high priority of the HRSA. Through support of continuing education courses, as well as development and dissemination of reference materials on current aspects of nutrition and provision of professional consultation and program assistance provided by its staff of central and regional nutrition consultants, the HRSA brings new nutrition knowledge to State and local health agencies for application in health care services. Translating new knowledge of nutrition into practical guidance for the consumer is another focus of HRSA nutrition education activities.

Three HSRA bureaus are actively involved in disseminating nutrition information and providing nutrition education: the Bureau of Health Care Delivery and Assistance (BHCDA), the Indian Health Service (IHS), and the Bureau of Health Professions (BHPr).

Bureau of Health Care Delivery and Assistance (BHCDA). The BHCDA supports training programs, continuing education, and information exchange activities for a wide range of practitioners—physicians, nurses, nutritionists, social workers and others—who deliver health care, including nutrition and other essential services. In addition, nutrition education for patients/clients is an integral program component. Following are highlights of these efforts:

Graduate Training: Graduate Training in Public Health Nutrition and Maternal and Child Nutrition is provided through traineeships and faculty support to institutions of higher learning. Nutrition is also included in graduate training programs in maternal and child health which train multidisciplinary staff for MCH programs. Specialized training in nutrition is provided through interdisciplinary training programs, including University Affiliated Programs in Mental Retardation, Pediatric Pulmonary Centers, and Adolescent Health Projects.

Continuing Education: The BHCDA supports numerous continuing education programs to help health care providers keep up with new knowledge in nutrition. Among these programs are the following:

- Maternal Nutrition—An Annual National Seminar on Nutrition in Pregnancy was held annually for the past several years at the University of Louisville College of Medicine with more than 100 participants annually. The Division of MCH of BHCDA continues to support the Intensive Course in Maternal Nutrition sponsored by the March of Dimes at the University of North Carolina. A workshop on adolescent pregnancy was held at the University of South Carolina in 1980.

- Perinatal/Neonatal Nutrition—Training seminars in perinatal/neonatal nutrition were initiated in 1978 at three centers specializing in perinatal medicine.

Each year more than 400 physicians, nurses, nutritionists and other key health professionals receive training through these seminars at Stanford University, Case Western Reserve University, and the Indiana Medical Center. In addition, four-month traineeships are available at the Indiana Medical Center to train nutrition specialists, and one-week clinical training to update practicing nutritionists in neonatal intensive care units is provided at Case Western Reserve University.

- Pediatric/Adolescent Nutrition—A week-long intensive course in Pediatric Nutrition for nutritionists, physicians, and nurses has been presented two or three times a year since 1968 at the University of Iowa. Over 2,500 nutritionists, physicians, and nurses have participated. Nutrition as it relates to children and adolescents with handicaps was the focus of four workshops held in California, Oregon, Ohio, and Massachusetts.

Information Exchange: The BHCDA has also taken steps to increase awareness of many publications besides its own. Many State and local health agencies develop nutrition education materials geared to the needs of specific populations. To inform nutrition and other personnel of the existence of these materials, the BHCDA maintains an exchange which provides for sharing of information and materials available from various sources to all State health departments, training programs, and selected special projects.

Patient/Client Education: Nutrition education is an integral component of comprehensive services in BHCDA programs. It involves person-to-person education in both individual and group contacts as well as indirect education through printed materials and media.

- Although most BHCDA nutrition education activities are aimed at ensuring the competence of health care professionals to deliver comprehensive nutrition care services, a limited number of consumer materials have been developed, including *Food for the Teenager During and After Pregnancy (7), Breast Feeding (8), and Nutrition Checkups for Children—Tips for Parents* in English and Spanish. (9, 10)

- During 1981 a joint HRSA/USDA committee worked to develop resource materials to assist health programs, food assistance programs, and other related programs to tailor their nutrition education services to specific needs, interests, and lifestyles of pregnant teenagers. The March of Dimes joined in this effort. The result of this joint public/private coordination is *Reaching Out to the Pregnant Teenager,* a resource packet for nutrition educators that has been widely disseminated.

- Several publications on phenylketonuria have been developed for health care providers, school personnel, and consumers.

Indian Health Service (IHS). As part of its comprehensive health service delivery system for American Indians and Alaska Natives, the IHS emphasizes the incorporation of nutrition education into every health, social, and education service and food assistance program.

Infant Feeding Practices: Major emphasis has been placed on prenatal nutrition education in breast feeding. Prenatal and postpartum classes have been held in all Service Units (geographical units of direct care delivery) with follow up. Nutrition education pamphlets have been developed specifically to meet the cultural food practices of specific Indian and Alaska groups. The existing educational materials used in conjunction with infant feeding classes in Maternal and Child Health Clinics have been revised to reflect the recommendations of the American Academy of Pediatrics.

Diabetes Nutrition Education: Slides with corresponding tapes in English and native Indian languages have been developed for use in Diabetes Clinics in selected sites. These can be utilized by public health nutritionists, registered dietitians, health educators, nursing personnel, and community health representatives. Outreach programs have been initiated to educate the Indian population about the symptoms and treatment of diabetes.

Nutrition Classes for Weight Problems: In conjunction with health education and physical therapy, weight reduction and exercise classes are being held in some of the IHS clinics. Also, preventive aspects are being stressed in the MCH classes. A new educational module for obesity classes has been added to the curriculum of the Nutrition and Dietetics Training Center, Santa Fe, and is now an integral part of the nutrition education programs.

Nutrition and Dietetics Training Center: The Nutrition and Dietetics Training Center was opened in 1968 to train food service supervisors, i.e., dietetic assistants. Since then it has expanded its education and training programs to include courses and workshops for tribal employees in nutrition programs. This year, inservice training and education, with emphasis on maternal and child health nutrition, was provided to 107 employees and 160 tribal employees.

Nutrition Education Workshops: To improve the communication skills of nutrition educators, a workshop, "Changing Food Habits and Attitudes," was developed and funded for 30 nutritionists, dietitians, and nutrition technicians.

Education Materials: Development of education materials compatible with the cultural patterns of specific tribal groups is a major focus in the IHS:

- A *Foodservice Manual* was developed by the Albuquerque Area Office Nutrition and Dietetics staff to meet the needs of cooks and food service personnel in the various nutrition programs of Head Start, Congregate Meals for the Elderly, Rehabilitation Programs, etc. Inservice classes were held on the use of the manual with subsequent followup visits. The manual is now being used throughout the 12 Area/Program offices of the Indian Health Service.
- Nutrition education handouts were developed specifically for anemia, infant and preschool nutrition, pregnancy, obesity, diabetes, and hypertension in concert with the eating patterns and available resources of the specific Indian area.
- A pictorial manual suited to the cultural needs of Indians in the Southwest by the Diabetic Initiative Project to improve nutrition education and understanding in the treatment of diabetes was developed and in use.

Bureau of Health Professions (BHPr). Nutrition education and information activities at the BHPr consist primarily of traineeships, grants, and contracts. The BHPr provides traineeship funding to medical schools, accredited schools of public health, and other graduate programs for student support in specific areas including public health nutrition. Dietetics and nutrition have been a priority focus and BHPr has awarded traineeships to public and nonprofit organizations for short-term or long-term advanced training of allied health personnel already employed in the field or in administrative positions. Clinical dietetics is one of the disciplines eligible for support.

A program for curriculum development in applied nutrition was designed to stimulate the development of innovative and alternative approaches to educating health care professionals through interdisciplinary programs. The goal was to improve the skills of physicians, nurses, and other health personnel in advising and instructing patients about diet and nutrition. The special grant funds, available in FY 81, helped cover the costs of planning, developing, demonstrating, operating, and evaluating projects related to education and training (including continuing education), definition of roles and functions, credentialing, and recruitment. Building on these efforts, the BHPr's Division of Associated and Dental Health Professions, under contract with Emory University, conducted a National Workshop on Nutrition Education in Health Professions. The workshop provided a national forum for the sharing of promising nutrition education practices within health professional schools, and for identification of the major issues confronting nutrition education in the health professions.

National Institutes of Health (NIH)

Several NIH institutes are active in nutrition education efforts:

National Cancer Institute (NCI). Two handbooks have been developed to help adult cancer patients: *Health Through Nutrition* (11) and *Eating Hints: Recipes and Tips for Better Nutrition During Treatment.* (12) The NCI also sponsored a workshop on physical education that identified many deficiencies and stressed the need for educational opportunities for health professionals. Based on the workshop's recommendations, the NCI began to expand its clinical education grant program to include a separate nutrition component. The Institute is supporting postdoctoral scholars in nutrition to increase the supply of qualified investigators.

National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases (NIADDK). Two popular public education pamphlets, *Facts About Nutrition,* (13) and *Facts About Obesity,* (14) have been developed. The Institute also contributed to the support of several conferences and workshops that had nutrition education components. These included a conference of the U.S.-Japan Malnutrition Panels in Osaka, in December 1978 on the effects of alterations of dietary patterns and food habits on health, in which special emphasis was placed on critical analysis of comparative epidemiological studies of different populations. A workshop on nutritional support of patients and research directions for the 1980's was held in Washington, D.C. in September 1979. The *Recommended Dietary Allowances* (15), prepared and published by the Food and Nutrition Board, National Academy of Sciences/National Research Council (NAS/NRC) under contract to the NIADDK, provides the standard for evaluating adequacy of nutrient intake of population groups.

National Heart, Lung, and Blood Institute (NHLBI). Several education and information projects have been initiated in the nutrition area, including the following:

Supermarket Heart Health Nutrition Pilot Program: The NHLBI and the Giant Food Corporation co-sponsor a program in 90 Giant supermarkets in the Washington, D.C., area to inform and encourage consumers to make personal risk assessments, as well as to evaluate the impact of point-of-purchase information on the pattern of purchases. Large in-store posters and free handout sheets called *The Eater's Almanac* give consumers information on the growing evidence of the link between diet and coronary heart disease. The program is now being evaluated.

Vending Machine Nutrition Projects: In cooperation with the National Automated Merchandisers Association and the Macke Company, the NHLBI conducted a pilot program in selected NIH vending machines containing both low- and high-calorie snack foods along with calorie information posted on the display windows. Initial results showed that marketing nutritious snacks can be profitable in the NIH setting.

Food for Thought Game: Designed for use in cafeteria settings, the purpose of this game is to encourage people to select more nutritious, lower-calorie foods. The program has been distributed nationwide through the American Heart Association and the American Hospital Association.

Research Demonstration for Health and Vascular Disease: Through this program involving cooperation with Home Demonstration Clubs of the County Extension Service, the NHLBI is attempting to change dietary habits, especially among low-income blacks. The program, which is directed to the general public, includes publications in Spanish designed for Hispanic populations in the greater Houston area.

Pilot Regional Workshops in Hyperlipidemia: These brief regional training workshops for nutritionists, dietitians, physicians, and other health professionals are designed to improve nutrition counseling skills by providing expert assistance and written and audiovisual materials. Program participants return for a followup evaluation session after several weeks of practicing their newly learned skills. The NHLBI is also working with national and local branches of the American Heart Association to enumerate and evaluate present and future nutrition counseling resources.

Clinical Trials: Nutrition education is a component of the Multiple Risk Factor Intervention Trials (MRFIT) and the Lipid Research Centers (LRCs) programs. Both of these clinical trials are aimed at primary prevention of cardiovascular disease. Nutrition education in the MRFIT is designed to reduce serum cholesterol levels by changing the intake of food, cholesterol, and calories. Dietary assessment tools help participants gauge the potential impact of high-fatty acid and high-cholesterol foods on serum cholesterol. The LRC program uses nutrition workshops, diet adherence activities, and education to achieve long-term dietary change and lower cholesterol levels.

General Public Communication: The NIH supports the production of public service announcements for radio and television. The NIH lecture series, "Medicine for the Layman," includes a session on infant feeding; videotapes of the series are available to public broadcasting stations. Communications personnel, as well as staff members throughout the NIH, regularly provide technical assistance on nutrition and other health matters to newspaper and magazine writers, State and local health officials, public interest groups, and private citizens.

Office of International Health (OIH)

Through a Nutrition Resources Service Support Agreement, the OIH helps the U.S. Agency for International Development strengthen nutrition activities in low-cost health delivery projects in developing countries. The program produces publications on nutrition intervention, answers requests for information, and performs literature searches and state-of-the-art reviews of nutrition education techniques.

Office of Human Development Services (OHDS)

Administration on Children, Youth, and Families (ACYF). The ACYF provides preschool children of low-income families with comprehensive services to meet their educational, social, health, nutrition, and physical needs. In addition to providing meals for children, the agency's programs help make mealtimes an opportunity for learning about nutrition. Head Start programs seek to assist staff, children, and their families to apply nutrition knowledge to develop sound food habits. The ACYF seeks to demonstrate the relationship of nutrition to overall child health and development and to train food service personnel in food service management.

Administration on Aging (AoA). The AoA encourages nutrition education and counseling, as well as other nutrition services, in the congregate meal program administered by AoA. These services are offered by public health and other nutritionists. dietitians, extention agents, and home economists in the majority of the nutrition service project sites.

The AoA and the CDC, in coordination with other government agencies and the private sector, have developed a training manual for elderly persons to provide peer counseling in nutrition.

Health Care Financing Administration (HCFA)

Nutrition education and information are included in the HCFA's recommendations to State agencies administering medical assistance programs and are intended to guide them in developing the nutritional assessment component of the Early Periodic Screening, Diagnosis, and Treatment Program (EPSDT). Through direct provision or appropriate referral, prevention, treatment, and followup services in nutrition (including diet counseling and nutrition education) are made available to meet the needs of children and their families.

Joint Activities in Nutrition Education

A joint USDA/DHHS Nutrition Education Committee for Maternal and Child Nutrition Publications has been established to assure consistency of message, avoid duplication, and make more effective use of resources. This joint committee is planning, in cooperation with key professional organizations, to develop a promotional effort related to breast feeding.

Future Directions for Nutrition Education/Information

Improved national health through disease prevention and health promotion is a major goal of the Department, and nutrition is one of the initiatives in the DHHS program to achieve this goal. Implementation plans to achieve the nutrition objectives for 1990 are under development, and nutrition education and information measures are major components of the plan. Each of the DHHS agencies will be contributing through development and dissemination of materials, public media information, and other educational activities.

Nutrition and Your Health: Dietary Guidelines for Americans, issued in 1980, continues to serve as the basis for consistent nutrition messages; periodically the *Guidelines* will be re-examined by the Department in light of emerging scientific evidence concerning the relationship between diet and disease. For example, a special interagency task force is reviewing the *Diet, Nutrition, and Cancer* report issued in June 1982 by the National Academy of Sciences and considering its implications for departmental nutrition activities.

In addition to continuing the development of specific education/information materials related to Department functions, cooperative and coordinated efforts with public and private sectors, such as the HRSA/USDA/March of Dimes activities concerning nutrition education services to pregnant teenagers, will continue.

References

1.–Nutrition and Your Health: Dietary Guidelines for Americans. 1980. USDA/DHHS Publication. USDA Home and Garden Bulletin No. 232. 20 pages.

2.–Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention. DHEW Publication No. (PHS) 79–55071. 177 pages.

3.–Promoting Health/Preventing Disease Objectives for the Nation. DHHS Publication (PHS). Fall 1980. 102 pages.

4.–National Conference on Nutrition Education: Directions for the 1980s. *Journal of Nutrition Education.* Suppl. 12:79–137, (1980).

5.–Nutrition Publications for Consumers: A Selected Annotated Bibliography. DHHS Publication (ODPHP). June 1983. 22 pages.

6.–Sodium: Think About It. DHHS Publication. (FDA) 82–2164. 4-Fold.

7.–Food for the Teenager During and After Pregnancy. USDA/DHHS, March of Dimes Publication. DHHS Publication No. (HRSA) 82–5106. 31 pages.

8.–Breastfeeding. DHHS Publication No. (HSA) 80–5109. 22 pages.

9.–Nutrition Checkups for Children—Tips for Parents. DHHS Publication No. (HSA) 81–5116. 8 pages.

10.–Examines de Nutricion para Ninos. Algunas Sugerencias para las Padres de Familia. DHHS Publication No. (HSA) 81–5116. 8 pages.

11.–Rosenbaum, Ernest H., Stitt, Carol A., Drasin, Harry, and Rosenbaum, Isadora R. Health Through Nutrition: A Comprehensive Guide for the Cancer Patient. San Francisco: Alchemy Books, 1978. 120 pages. (distributed by NIH/NCI)

12.–Eating Hints: Recipes and Tips for Better Nutrition During Treatment. DHHS Publication No. (NIH) 82–2079. 86 pages.

13.–Facts About Nutrition. DHEW Publication No. (PHS) 68–917. 25 pages.

14.–Facts About Obesity. DHEW Publication No. (NIH) 76–974. 20 pages.

15.–National Research Council, Food and Nutrition Board. Recommended Dietary Allowances, Ninth Edition. National Academy Press, Washington, D.C., 1980.

CHAPTER 4

Nutrition Services and Manpower

The Department of Health and Human Services considers nutrition services and the manpower necessary to provide these services to be essential components of the health care delivery systems it operates or supports. The goals of nutrition programs within these delivery systems are the promotion of health and the prevention, treatment, and rehabilitation from disease and disability.

Nutrition services include: food service in hospitals, long-term care institutions, child care centers, and meal sites for the elderly; screening and assessment of the nutrition status of individuals; treatment and followup, including the implementation of nutrition care plans for individuals; counseling and education programs; referral to community resources; and promotion of sound nutrition practices in the community. Such services are provided for mandated Federal beneficiaries, the medically underserved, and other populations specifically identified by the Secretary as being at high risk for disease or disability.

Public health nutritionists are specialized nutrition professionals who provide nutrition services through agencies which organize and deliver health services to communities. They are responsible for assessing community nutrition needs and planning, organizing, managing, directing, coordinating, and evaluating the nutrition component of the health agency's services. Public health nutritionists in both the Central and Region offices of the DHHS are working with their counterparts in State and local health agencies to improve the administration and management of nutrition services in health care programs. Efforts have included attention to the areas of policy development, resource improvement, program planning and evaluation, and quality assurance.

Nutrition Services Programs in Health Care Delivery Systems

Nutrition Services for Mothers, Children, and Families

The Department supports nutrition services for children in both health care and child care services. Titles V and XIX of the Social Security Act (SSA), as well as many sections of the PHS Act (e.g., section 330) provide for health care, including nutrition services, such as nutritional screening/diagnosis and counseling, to millions of the Nation's mothers, children from birth to 21 years of age, and families. Such services are provided through State and local public health agencies, community health centers, school health programs, and the private sector. Title XX of the SSA provides comprehensive single social services that include meals for children in day care centers. The Head Start Program, funded under Title V of the Economic Opportunity Act, provides comprehensive health services to low-income children aged 3 to 5 years.

Nutrition Services for the Elderly

Two programs seek to prevent or alleviate nutritional deficiencies in the elderly: the nutrition program under Title III of the Older Americans Act, and social service programs under Title XX of the SSA. Under Title III, significant funding is provided for congregate and in-home meal service to persons aged 60 or over and their spouses. Under Title XX meals also are provided to older Americans in a variety of settings.

Nutrition Services to Long-Term Care and High-Risk Population

Nutrition services are provided to persons in long-term-care institutions, medical facilities, and other institutions, and to individuals who have returned home but still need special nutrition services such as home-delivered meals. Under Title XX of the SSA, these services are delivered as a component of other health and social services. For example, persons who have been released from health care facilities are helped to live independently through a variety of social and health-related services, including education to overcome inadequate nutrition habits. Also, emergency services often include assistance in the purchase and preparation of food.

The comprehensive social services provided to children, adults, and families under Title XX are designed to serve all groups, including such high-risk groups as migrant workers, seasonal workers, and Native Americans. High-risk groups are also served by an array of programs supported by the Health Resources and Services Administration (HRSA). For example, the Migrant Health Program provides health care to migrant workers, seasonal farm workers, and their families; other projects focus on specific geographic areas that have inadequate access to health care services.

In addition, the Administration on Aging (AoA) supports the provision of in-home meal service to the homebound elderly.

Recruitment and Training of Nutrition Professionals and Paraprofessionals

A number of DHHS activities have been instituted to train health professionals for the provision of nutrition services. The training ranges from brief on-the-job activities for food service personnel to specialized professional curricula in nutrition for physicians, nurses, and other health personnel.

Agencies for the elderly design a wide variety of short-term on-the-job programs to give food service personnel basic information for providing nutrition services. Funds awarded to State and Area Agencies on Aging under Title III and Title IV of the Older Americans Act may be used for this purpose. In addition, the AoA has awarded a multi-year national contract designed to provide training and technical assistance to State agencies on aging, area agencies on aging, and meal nutrition provider staff who are responsible for maintaining and upgrading the capacity of direct service personnel. Programs under Title XX of the SSA also provide in-service training for program personnel. Maternal and child health funds under Title V of the SSA support long- and short-term training programs in public health nutrition and maternal and child nutrition for nutritionists, physicians, and others. Training is also provided under the Indian Health Care Improvement Act.

Nutrition Services and Manpower Activities in Specific Agencies

Food and Drug Administration (FDA)

The FDA is not specifically involved in manpower development, but the visiting scientist programs (including national and international scientists), staff fellowship programs, and other programs offer limited opportunities for collaborative study and training.

Health Resources and Services Administration (HRSA)

In addition to providing support for a wide range of direct service programs, the HRSA plays an important role in aiding all levels of governmental and private efforts to establish viable health systems throughout the United States, especially in underserved areas, to improve the organization and efficiency of health care delivery; to promote effective and equitable public health and preventive services; and to reach particular groups and populations mandated by law, e.g., mothers and children, migrant workers and families, Native Americans, and Alaska Natives.

Nutrition is an important component of all HRSA programs and involves support for nutrition services in health care systems; for provision of food and nutrition services in PHS hospitals; for professional consultation and technical assistance in nutrition to private, public, and voluntary health agencies and care providers; for development of nutritional standards and criteria to ensure quality; and for education of a wide range of professionals and paraprofessionals who can impact on nutritional health.

Bureau of Health Care Delivery and Assistance (BHCDA). The BHCDA provides leadership and is responsible for developing and improving nutrition services in a wide range of health programs that help ensure the delivery of primary health care, preventive health services, and other specialized care to medically underserved populations and other groups with special health needs. Essential BHCDA functions include professional and technical consultation, policy and standards development, budget administration, short- and long-term planning, grants and contract administration, and project monitoring to ensure program and management effectiveness.

Nutrition services provided in the Bureau's health care programs include:

- Assessment of nutritional status and diagnosis of nutritional problems of individuals under care.
- Dietary counseling as part of preventive and treatment services.
- Nutrition education for health care providers as well as for patients, families, and the community.
- Treatment and followup of nutrition problems and assistance in locating food and other resources necessary to maintain and promote nutritional health.

These nutrition services are provided in the following Bureau programs:

Maternal and Child Health and Crippled Children's Program: There are BHCDA programs in all States and territories which provide leadership and support in planning, developing, and implementing health care services for mothers and children. Preventive health care such as prenatal care, newborn screening, and well-baby care, as well as specialized services such as perinatal intensive care and diagnostic and treatment services for handicapped children, are provided through public agencies and private providers. In 1980 and 1981 nearly six million children received nursing services, more than 500,000 women received maternity care, and more than 750,000 handicapped children were served.

Community Health Centers: The 872 Centers provided comprehensive health care, including nutrition services, to 4.2 million persons in 1980 and an estimated 5.2 million in 1981.

Migrant Health Programs: By the end of FY 81, 128 migrant health centers provided health care and nutrition services to an estimated 394,000 migrant and seasonal farm workers.

Family Planning Grants: (Now administered in the OASH.) More than 5,100 service sites are supported by 222 of these grants.

Appalachian Health Projects: These 185 projects support primary care for residents in the Appalachian region.

Black Lung Clinics: Victims of black lung diseases are served by 82 of these clinics.

Specialized Health Service Programs: These include 57 hypertension projects and 36 area-wide genetic disease systems that provide genetic testing, counseling, and education services.

The BHCDA promotes and supports the development of nutrition services in State and local health care programs through financial support for nutrition personnel in State and local health programs, professional consultation and technical assistance from public health nutritionists in the regional PHS offices, support of graduate training of nutrition personnel for health programs serving mothers and children, and development of guides and standards for nutrition services and nutrition personnel in community health programs.(1, 2)

A major goal of the Bureau is to improve the organization and management of nutrition services in State and local health agencies by such activities as improving the data base for nutrition planning, improving nutrition service coordination, supporting continuing education programs for State leadership in nutrition in areas of program planning and evaluation, and reviewing the nutrition services of State health agencies. Additionally, the Bureau continues to improve its nutrition criteria and standards as a base for quality assurance.

The BHCDA administers the National Health Services Corps (NHSC), which has placed approximately 2,000 health professionals in areas short of manpower. These include 107 public health nutritionists who fulfilled scholarship payback obligations by serving for two years in medically underserved areas such as community health centers and migrant health programs.

Indian Health Service (IHS). The IHS has responsibility for total nutrition care services for American Indians and Alaska Natives. This is accomplished through preventive and direct care nutrition services in 96 service units; management and operation of 49 IHS dietary departments; education and development programs to encourage careers in nutrition for Native Americans; recruitment of qualified professionals for IHS facilities and tribally administered health departments; consultation and direct services to tribal feeding programs with food service and nutrition education components; assumption of the advocacy role in improving the quantity and nutritional quality of the food supply; and in-service education for other members of the IHS.

IHS programs supply nutrition consultation and direct nutrition services to a wide range of programs providing food services to American Indians and Alaska Natives, including the USDA Special Supplemental Food Program for Women, Infants and Children (WIC); Head Start Program; Nutrition Program for Older Americans; National School Lunch Program; School Breakfast Program; and Summer Food Service Program for Children.

Education and career training in nutrition and nutritional care are provided under the Indian Health Care Improvement Act, PL 94–437, which authorizes recruitment and education of American Indians and Alaska Natives in health professions. In FY 79, 23 scholarship recipients in the program were majoring in nutrition and dietetics. Other IHS activities include funding of a diabetes initiative in five selected sites to identify, treat, and provide followup services to diabetic patients and their families; and establishing and staffing four new hospital dietetic services in FY 79. The Nutrition/Dietetic Training Program provided in-service training and education to 107 IHS employees and 160 tribal employees in 1981.

Bureau of Health Professions (BHPr). Through its various programs for health professionals, BHPr contributes significantly to supplying trained manpower to the field of nutrition. The nutrition manpower programs are described below:

Division of Associated and Dental Health Professions (DADHP). The DADHP is the focal point for Federal activities supporting the development and utilization of health manpower resources in public health, dental health, and allied health, as well as optometry, pharmacy, and veterinary medicine. The Division plans, supports, and evaluates a wide variety of projects relating to education and training of health personnel, training for interdisciplinary and multidisciplinary approaches to health care delivery, continuing education, and ensuring the competence of health workers. Elements of the specific nutrition education programs administered by the DADHP (described in Chapter 3) contribute to the supply and competence of nutrition service providers.

Division of Medicine (DM). The DM is the focal point for the education, practice, and research of medical manpower, with special emphasis on allopathic and osteopathic physicians, podiatrists, and closely associated assistants, particularly physician assistants. Its various programs contribute to educating students in the field of nutrition.

For example, while the Area Health Education Centers Program is an educational rather than a service intervention and, therefore, does not provide direct services to individuals as clients, the Program does require that each of its institutional recipients provide nutrition education to health professionals as preparation for becoming primary care providers. In doing their clinical training at remote sites, health professions students, including nutritionists, might provide consumer nutrition education or counseling as part of their required experience. As an illustration, in Hartford, Connecticut, medical students provide nutrition counseling to underserved urban populations receiving primary care at a multi-purpose center. In San Diego, California, a structured community program geared particularly toward the Hispanic population is teaching health practitioners to relate nutrition concepts to a basic Mexican-American diet.

In FY 82, in particular, a number of DM programs have awarded funds to grantees proposing to expose students to nutrition education activities and/or requesting specific funds to support nutrition educational efforts. A total of 97 grantees from the Family Medicine Departments Program, Family Medicine Pre-Doctoral Training Program, Physician Assistants Program, Family Medicine Residency Training, and Primary Care Residency Training Program indicated activities in this area.

Office of Human Development Services (OHDS)

The OHDS, the principal unit in the DHHS for providing social services, has three major programs incorporating nutrition services and manpower development and training. These programs—the National Nutrition Program for the Elderly (managed by the Administration on Aging); the Head Start Program (managed by the Administration for Children, Youth, and Families); and the Title XX Social Service Program—are summarized in the following sections.

Administration for Children, Youth, and Families (ACYF). The Head Start program provides preschool children of low-income families with comprehensive services to meet their educational, social, health, nutritional, and psychological needs.

The nutrition complement, an integral part of health services, is concerned with the evaluation of the child's nutrition status and food habits and remedial action if appropriate; the provision of nourishing meals and snacks, and nutrition education for the child, his parents, and staff, including the food service personnel.

Nutrition performance standards provide guidance for Head Start staff and parents to help them establish a quality program for the enrolled children. Parents are closely involved in the development and implementation of the nutrition program through their participation on committees.

On-the-job and short-term training programs instruct the nontechnical staff and parents in the importance of good nutrition and the relationship of good dietary practices to good health. A considerable portion of the training program for staff and families of Head Start children is devoted to child nutrition, to establishing good dietary habits, selecting and preparing food, and good health and safety practices.

Publications which have been developed by the Head Start Bureau to strengthen the nutrition services and nutrition education include:

- Handbook for Local Head Start Nutrition Specialists (3)
- Nutrition Training Guide for Classroom Personnel in Head Start Programs (4)
- Nutrition Education for Young Children (5)
- Training Guide for Food Service Personnel in Programs for Young Children (6)
- Planning and Organizing the Food and Nutrition Service for Head Start Programs (7)
- Handbook for a Basic Fund Balance Accounting System for the Head Start Food Service Program (8)

Administration on Aging (AoA). The AoA is responsible for administering the Older Americans Act—Title III—grants for State and Community Programs on Aging. Title III–C authorizes nutrition services for persons over 60 years of age and their spouses. The program, which provides low-cost, nutritionally sound meals, is directed to older persons with greatest economic and social need, to promote better health among the elderly through improved nutrition. In FY 82, over 190,000,000 meals were provided to the elderly in group settings and in the home. Title VI of the Act provides for nutrition and social services to Indian Tribal Organizations. Approximately 1,225,000 meals are provided annually to elderly Indians under Title VI.

Nutrition service providers in this program supply at least one hot or other appropriate meal a day, five or more days a week. Meals are delivered to homebound older persons when necessary. The meals must meet at least one-third of the Recommended Dietary Allowances. Where feasible, service providers develop menus that meet special dietary needs arising from participants' health problems, religion, or personal preferences. Many of the participants receive nutrition education in conjunction with the meal service.

The program employs about 36,800 paid staff and relies heavily on the services of more than 278,900 volunteers, including many older persons who are also participants. Volunteers also work under the Retired Senior Volunteer Program.

The program is operated through designated State and Area Agencies on Aging and tribal organizations in a manner consistent with State, local, and tribal plans developed to provide a range of comprehensive services to older persons. In addition to direct meal service, individual State and Area Agencies and service providers devote resources to in-service training of service delivery personnel.

Publications which have been developed by the AoA to strengthen nutrition services include *Nutrition Providers' Guide to Program Management* (9), *Accounting and Fiscal Management* (10), *Site Management* (11), *and a Guide to Training* (12).

Joint Activities in Nutrition Services and Manpower

The principal outside coordination of nutrition services is with the USDA. The Head Start Program coordinates closely with the USDA Child Care Food Program, National School Lunch Program, and the USDA Extension Service. The food and food service costs of Head Start are partially reimbursed by the USDA. Other coordinated activities with the USDA relate to development of nutrition materials, joint training activities, and review of pertinent policies and program regulations. Head Start also has close ties with the USDA's WIC Program.

The IHS coordinates closely with the USDA's food assistance programs with the Department of Interior's Bureau of Indian Affairs, and with the Department of Commerce's Aboriginal Subsistence Program. Close ties are also maintained between nutrition services of the IHS and the private National Indian Health Board and National Indian Food and Nutrition Resource Center.

Central and regional nutrition staff of the BHCDA work cooperatively with a broad range of Federal, regional, State, and local agencies as well as the private sector, voluntary agencies, professional organizations, consumer groups, and others to promote and develop nutrition services as an integral part of health care services. Significant activities are carried out with organizations and agencies such as the Association of State and Territorial Public Health Nutrition Directors; National Association of Community Health Centers; Committee on Nutrition of the American Academy of Pediatrics; American Dietetic Association; American College of Obstetricians and Gynecologists; the March of Dimes; USDA, especially the Food and Nutrition Service; and the Department of Education. Cooperation with these agencies involves policy guidance, continuing education, preparation of educational materials, and many other activities.

The Nutrition Services, under Titles III and VI of the Older Americans Act, work closely with USDA's Food Distribution Program in connection with the cash and commodity reimbursement for which the service is entitled. State Agencies on Aging maintain written agreements with State Distribution Agencies for the timely and efficient distribution of USDA Commodity Foods.

References

1.–Association of State and Territorial Health Officials Foundation. Personnel in Public Health Nutrition for the 1980's. 1311 A Dolly Madison Boulevard, Suite 3A, McLean, VA 22101.

2.–Guide for Developing Nutrition Services in Community Health Programs. DHHS Publication No. (HSA) 78–5103. 100 pages.

3.–Handbook for Local Head Start Nutrition Specialists. 1983 DHHS Publication (OHDS/ACYF). 49 pages.

4.–Nutrition Training Guide for Classroom Personnel in Head Start Programs. 1976 DHHS Publication (OHDS/ACYF). 82 pages.

5.–Nutrition Education for Young Children. DHEW Publication No. (OHDS) 76–31015. 47 pages.

6.–Training Guide for School Food Services Personnel in Programs for Young Children. DHEW Publication No. (OHDS) 80–31152. 195 pages.

7.–Planning and Organizing the Food and Nutrition Service for Head Start Programs. DHHS Publication No. (OHDS) 80–31141. 55 pages.

8.–Handbook for a Basic Fund Balance Accounting System for the Head Start Food Service Program. DHHS Publication No. (OHDS) 80–31141. 24 pages.

9.–Nutrition Service Provider's Guide to Program Management. DHHS Publication No. (OHDS) 81–70671. 308 pages.

10.–Nutrition Provider's Guide to Accounting and Fiscal Management. DHHS Publication No. (OHDS) 81–70673. 176 pages.

11.–Nutrition Service Provider's Guide to Site Management. DHHS Publication No. (OHDS) 81–70672. 311 pages.

12.–Nutrition Service Provider's Guide to Training. DHHS Publication No. (OHDS) 82–20674. 201 pages.

Chapter 5

Food Safety, Quality, and Regulation

In recent years it has become clear that nutritional quality is an important part of food safety. Improved food technology has generally improved the nutritional quality of our food supply during the last century, but evidence is growing that extensive replacement of conventional less-processed foods with highly processed foods may be causing new nutritional problems.

- The National Health and Nutrition Examination Survey I (NHANES I) suggests that caloric intake may have dropped to such low levels in certain segments of the population that it is questionable whether they are getting adequate amounts of essential nutrients.
- As Americans shift to foods that bear little biological resemblance to traditional foods, the potential for harmful (or beneficial) interactions for nutrients with other nutrients, drugs, food additives, and other food components grows.
- There is a potential for toxicity from injudicious use of high-potency dietary supplements by large segments of the population. An incredible array of dietary supplements, especially vitamins and essential minerals, is available to the public. Numerous cases of vitamin A toxicity have been reported recently, and other toxicities are suspected.
- Bioavailability of nutrients becomes a more critical issue as the number and complexity of processed foods increases. These foods may have a mix of nutrients and other ingredients that can alter digestion and absorption and thus affect nutrient bioavailability.
- The growing use of vegetable protein flours, concentrates, and isolates as meat extenders and as basic ingredients for fabricated foods raises questions about their overall nutritional consequences. For example, the high phytate content of vegetable proteins has recently been reported to decrease bioavailability of zinc and iron. These proteins may also contain other antinutritional factors.
- Food fortification becomes a more important issue as changes in dietary patterns and the food supply occur. Dietary intakes of some essential nutrients, such as iron, zinc, and folic acid, have been reported to be low in certain segments of the population.

Significant Activities in Food Safety, Quality, and Regulation

The Food and Drug Administration (FDA) has the major Federal responsibility for food safety. The FDA carries out its mission by developing regulations, policies, and guidelines; providing technical services; conducting surveillance and review; developing model ordinances and codes; and working collaboratively with the food industry. The following are examples of FDA activities in the areas of regulations and guidelines, policy development, and surveillance and review.

Regulations and Guidelines

- Regulations for quality control procedures in the manufacture of infant formula to ensure adequate amounts of essential nutrients and for the safe recall of any potentially harmful formula in sales channels have been developed under the requirements of the Infant Formula Act of 1980. Proposed new regulations for labeling of infant formula are being developed to promote the safe use of these products by consumers.
- To increase public awareness of the sodium content of foods, regulations have been proposed to require food labels to declare sodium content and to define terms such as "low sodium" and "sodium reduced." At the same time, the food industry is being encouraged to voluntarily reduce overall sodium content of processed foods.
- Regulations on enrichment standards for common foods such as bread, flour, milk, and margarine are continually reviewed to determine if changes are needed for specific staples, with special emphasis on iron, zinc, folic acid, vitamin B6, vitamin A, and calcium.
- A final regulation is being developed governing the nutritional quality of vegetable protein products used as substitutes for animal products in processed food.
- Nutritional quality guidelines have been proposed for specific classes of processed foods such as ready-to-eat and hot breakfast cereals.

Policy Development

- To prevent over- or underfortification and nutritional imbalance, a uniform set of principles has been developed for the rational addition of nutrients to foods by manufacturers.
- A policy is in effect requiring that substitute foods, other than those labeled "imitation," not be nutritionally inferior to the foods they replace.
- Lead concentration in canned foods is being closely monitored and reviewed in response to recent evidence suggesting clinically significant adverse effects from lead.
- Policy is being developed to improve the safety relative to the consumption of vitamin and mineral supplements.
- Policy is being developed for "medical foods," i.e., special foods used under medical supervision for the dietary management of serious diseases and disorders.

Surveillance and Review

- Baseline data have been collected for a study in which repeated surveys over time will measure the impact of regulations and policy on food consumption and food labeling.
- Surveillance systems are being developed to provide early warning of any deterioration in the nutritional quality of the food supply.
- Review and research is in progress on the bioavailability of different forms of iron used for food fortification, the adverse effects of nutrient interactions and the potential for nutrient toxicity, the role of dietary fiber in the prevention or amelioration of significant diseases, and the development of official Association of Analytical Chemist (AOAC) methods for regulatory analysis of dietary fiber.

Joint Activities in Food Safety, Quality, and Regulation

Within the U.S. Department of Health and Human Services

Close communication on matters of food safety and food quality has been continuous among various DHHS departments and agencies and will continue to develop, as in these examples:

FDA and Centers for Disease Control (CDC). The FDA and the CDC maintain a close working relationship on issues of food safety and nutritional quality. Recent examples are the cooperation between the two agencies on the problem of chloride-deficient infant formulas and liquid protein weight reduction products.

FDA and National Center for Health Statistics (NCHS). Data from the National Health and Nutrition Examination Survey (NHANES I and II) serve as a basis for FDA policies concerning food fortification and other actions affecting the nutritional quality of the food supply.

FDA and National Heart, Lung, and Blood Institute (NHLBI). The FDA and the National High Blood Pressure Education Program of the NHLBI are cooperating on an initiative to educate the public about the relationship between sodium and hypertension.

With the U.S. Department of Agriculture

The FDA has a close working relationship with the USDA on the nutritional aspects of food safety. Specific examples include proteinase inhibitors and iron bioavailability associated with plant protein products.

Future Directions for Food Safety, Quality, and Regulation

The increased intake of some nutrients to levels that may pose health hazards for some people is a matter of concern to the DHHS. For example: the sodium content of the food supply is at a level that some believe contributes to hypertension in sensitive individuals; the iodine intakes of Americans are far in excess of what is needed for adequate nutrition; other nutrient excesses are possible from lack of discretion in food fortification. The potential for nutrient toxicity is further heightened by the recent trend of megadose consumption of some essential nutrients by large numbers of people. These potential hazards have led the Department to plan relevant research projects, as described under FDA research in Chapter 1.

CHAPTER 6

International Nutrition

International nutrition can roughly be divided into nutritional issues relevant to the affluent developed countries and issues relevant to developing countries. The other chapters in this report have focused principally on developed-country issues. In this chapter, the main focus is on the underdeveloped and undernourished populations outside the United States.

Approximately 800 million people in the world live in poverty and suffer from malnutrition leading to poor health, high levels of infant and child mortality, and reduced capacity to learn and work. While protein deficiency is a serious problem among certain populations, it is now generally accepted that inadequate caloric intake—lack of food energy—is the predominant nutrition problem in the developing world today. When caloric intake is chronically low the body adapts by conserving energy for only the most vital functions; growth, physical development, and physical activity suffer as a result. Even mild to moderate malnutrition is thought to be associated with impaired cognitive development in children. The apathy and lethargy common in malnourished children may further handicap their intellectual and behavioral development by reducing their interaction with the environment. The smaller physical size of people chronically malnourished in childhood diminishes their work capacity when they become adults.

The malnourished are more susceptible to infections, and since infectious diseases increase the body's requirement for calories the already malnourished are further threatened. Thus diarrhea and common childhood diseases like measles, which are relatively benign in well-nourished children, are a major cause of childhood death in poor countries. Malnutrition is thought to be a contributing factor in one-third to one-half of the infant and young child deaths in the developing countries each year.

Deficiencies of specific nutrients also have serious public health implications in the developing world. Nutritional anemias, especially those due to iron and folate deficiencies, affect as many as half of the child-bearing-age women in some populations. These types of anemia are associated with poor fetal development and subsequent diminished physical and mental performance. Vitamin A deficiency, a serious problem throughout the developing world, affects growth, resistance to disease, and vision. Each year an estimated 500,000 children are affected by keratomalacia and xerophthalmia, and 100,000 are permanently blinded by inadequate intake of vitamin A.

Given the importance of nutrition status to the productive capability of a population, adequate nutrition is being viewed as an essential investment in human capital formation for countries striving for economic and social development. Action specifically directed to improving the diets of the poor is needed to avoid significant suffering and to improve the ability of societies to develop. The DHHS regards adequate nutrition as a basic human right and an important element in the process of economic and social development. The Department plays a leading role in the international health community's efforts to improve nutrition in the developing world.

Major Issues in International Nutrition

Increasing Access to Minimally Adequate Diets

In the long term, the access of the poor to adequate food largely depends on greater food availabiity and higher income. More food can be made available by increasing food production and reducing food losses due to poor storage and transportation facilities. But this is not enough. Nutritional considerations need to be explicitly included in decision making on agricultural production and rural development. What foods will be produced, how they will be produced, and how they will be distributed are critical considerations in determining how much benefit the nutritionally needy will gain from increased food production.

Integrating Nutrition and Development

Too often development activities are designed and implemented in an isolated manner and without consideration of their potential impact on nutrition status. An agricultural production project, for example, may not benefit the neediest if its planners fail to consider what foods are needed to complement the diets of the poor or how the poor will get access to the food that is produced. A serious regard for nutrition objectives, a multidisciplinary approach, and an explicit review of the nutrition effects of proposed and continuing activities in health, education, and agriculture are all important to ensure a positive nutrition impact from development projects. Better integraton of nutrition goals into development activities also requires more research on the nutrition impact of development projects, as well as better dissemination of research findings to decision makers.

Identifying Cost-Effective Intervention

In the short term, improved food production and income generation are unlikely to cause significant improvements in the diets of the neediest. Direct intervention is, therefore, needed to avert suffering and improve people's capability to participate in their society's development. Several types of nutrition intervention are possible, but the health sector should consider issues pertaining to cost-effectiveness before selection of interventions. Possible interventions include: supplementary feeding programs, food price subsidy programs, and nutrition activities in primary health care. This latter area is of particular interest in light of the WHO goal "Health for All by the Year 2000," and because of the central role that primary health care plays in country health strategies to achieve the goal.

The Need for Monitoring

Simple surveillance systems to gather information on a limited number of salient variables can be a key element for successful nutrition strategies in poor regions, for they enhance the ability to plan, target resources, and identify the most appropriate interventions. Information gathered by community-based monitoring systems in primary health care programs has direct usefulness at the local level, but when local monitoring systems also feed information into a larger system it also becomes useful for national and regional planning. It is important that monitoring of nutrition programs be continuous to allow for adjustments while they are in progress. More refined indicators of nutrition risk would be useful in targeting and monitoring the impact of nutrition interventions. There is need for operational research in developing countries to determine the best ways to improve the delivery of the basic, minimum nutrition interventions that have already been found effective.

Departmental Activities in International Nutrition

Each of the DHHS health agencies engaged in nutrition activities domestically has, at one time or another, been engaged in international nutrition activities. The purposes of this involvement include: (1) advancing knowledge on nutrition-related health issues through research and exchange of experts, (2) development and representation of U.S. policy on international nutrition issues, (3) furthering the objectives of the U.S. foreign assistance program through the provision of expert technical assistance to the Agency for International Development and to other countries in nutrition and nutrition-related areas.

Multilateral Cooperation

The Public Health Service cooperates with agencies of the United Nations System on nutrition and nutrition-related matters. These agencies include the World Health Organization (WHO), and its Regional Office for the Americas, the Pan American Health Organization (PAHO), the Food and Agriculture Organization (FAO), and the United Nations Children's Fund (UNICEF). Activities have included: (1) the provision of technical assistance and expertise in field programs and nutrition advisory panels, (2) assistance in the development of U.S. policies on various international topics (e.g., WHO/UNICEF policies on infant and preschool child feeding practices). The DHHS has cooperated closely with the FAO in such areas as nutrition research and food quality control, among others, and has contributed to the work of the *Codex Alimentarius* Commission in its efforts to establish food standards for international trade.

A prominent issue has been the International Code on the Marketing of Breast Milk Substitutes. The DHHS and several of its agencies participated in defining the U.S. position relative to the Code and convened two task forces to study the issues related to the Code. One considered the relationship of infant feeding to health, particularly the use of breast milk substitutes, and the major factors that influence maternal choices regarding infant feeding. The other reviewed the relevance of the Code to U.S. law and policy and developed background information on public and private activities to promote infant nutrition, including breast feeding, in the U.S.

Bilateral International Cooperation

The principal countries with which the DHHS has bilateral health agreements involving nutrition are Egypt, Japan, India, and the People's Republic of China. Illustrative examples of activities are the following:

Egypt: The program with Egypt has included studies of the microbiological contamination of foods, the functional consequences of clinical anemia and subclinical iron deficiency, poisonous plants contaminating edible ones and the toxic substances in plant foods, and the early introduction of supplementation foods on subsequent growth and infection rates in young infants.

The Food and Drug Administration (FDA) has had a number of projects in Egypt that are directed toward the problems of poor food quality and unsafe foods. The food safety situation in Egypt is especially acute. The high population density in the Nile Valley and Delta, coupled with massive urbanization, has in some areas created crowded and unsanitary conditions and has led to a high-risk health situation. Foodborne diseases, in addition to nutritional deficiencies, are most often implicated as the cause of diarrheal problems, leading to increased perinatal, infant, and child mortality. Among adults in Egypt, nutritional anemia is the most widespread nutritional disorder and studies suggest that the result has been reduced productivity. Although the general problem of malnutrition is complex, a variety of contributing factors, such as food availability, poor hygiene, and endemic disease can be reduced or eliminated by an effective food control system. The FDA has cooperated with Egypt in the conduct of several successful workshops to identify critical problem areas and to explore methods of effective utilization of Egyptian scientific and technological expertise to solve these problems.

Japan: A major component of the U.S.-Japan Cooperative Medical Sciences Program is the Malnutrition Panel, which encourages and supports research of special relevance to lower socioeconomic groups in Asia. Such studies include the influence of environmental and host factors on nutritional requirements; health significance of iron deficiency and methods of preventing it; interaction of nutrition, immune competence, and infection; effects of nutrition on physical and mental development, behavior, physical capability, and work performance; and health consequences of dietary patterns and food intake.

The U.S.-Japan Program has supported studies to evaluate the use of common foods such as rice, wheat, or potatoes as supplementary weaning foods in early childhood; the effect of lipotropic factors such as choline, methionine, folic acid, and vitamin B_{12} in the maternal diet on the development of the immune system of animal offspring; and zinc supplementation in young children. The Joint Malnutrition Panel and the NIADDK also supported research in which a simple test for subclinical vitamin A deficiency was developed. This test can be used under field conditions with children as young as four years of age.

In 1982, under the auspices of the U.S.-Japan Science and Technology Agreement, the U.S. and Japan agreed to cooperate in the field of cardiovascular disease. Hypertension is a serious cardiovascular problem in both countries. It is a risk factor for serious complications such as heart attacks, strokes and renal disease and exacts a high toll in disability and deaths resulting in economic losses totalling billions of dollars. In Japan, stroke is by far the most prevalent consequence of hypertension, while heart attack is the more prevalent outcome in the United States. These differences in disease outcome raise challenging scientific questions, whose solutions promise to shed new light on the etiology and control of hypertension. It is these questions that the U.S.-Japan cooperative activities will seek to address through the exchange of information, data, and scientific experience between the two countries. The Joint Malnutrition Panel has sponsored workshop on "Methodologies for Human Population Studies on Nutrition Related to Health" and "The Effects of Alterations of Dietary Patterns and Food Habits on Health with Special Reference to Critical Analysis of Comparative Epidemiological Studies of Different Populations."

India: DHHS health agencies have a long history of cooperative activities with India. In 1982, an agreement was signed between the National Eye Institute, NIH, and the National Institute of Nutrition (NIN) in Hyderabad, India, to develop a clinical research center for nutritional blindness at the NIN. The research is aimed at determining the relationship between vitamin A and keratomalacia/xerophthalmia, which is the leading cause of blindness worldwide. The seven research projects comprising the Center are:

- Role of infection in keratomalacia
- Relationship between measles, keratomalacia and blindness
- Collagenase activities in cornea and its relationship to keratomalacia
- Vitamin A load for determining liver stores in vitamin A deficiency
- Immune response in vitamin A deficiency
- Vitamin A absorption and oral hydration in children with diarrhea
- Case control study to determine the risk factors in keratomalacia

Financial support for this joint research program is provided through the Indian Council for Medical Research, the U.S. Agency for International Development, and the PHS Special Foreign Currency Program.

People's Republic of China: A health protocol between DHHS and the Ministry of Public Health of the People's Republic of China was signed in 1979. The protocol calls for cooperation in several areas, some of which have nutritional components. For example, the effect of dietary selenium on cancer risk and incidence will be evaluated in an NCI-supported collaborative study. It has been demonstrated that the intake of selenium in humans is very low in certain areas of the PRC. This study will correlate the selenium intake in various areas of China and the incidence of specific cancers to test the hypothesis that selenium reduces cancer incidence. Other nutrients—vitamin E, vitamin A/beta carotene, vitamin C, and vegetable fat—that interact with selenium will also be studied.

International Nutrition Activities in Specific Agencies

Centers for Disease Control (CDC)

Under an agreement with the U.S. Agency for International Development (AID), the Centers for Disease Control has provided technical assistance in nutrition status assessment, development of nutrition surveillance systems, and manpower training networks in developing countries.

In 1982, consultations were held with the Government of Swaziland in preparation for a nutritional status survey, to be conducted in the late summer of 1983. A WHO-sponsored consultation was provided to the Government of Malaysia in 1982 regarding a project to identify pregnant women at risk of poor pregnancy outcomes.

Under an agreement with the AID, a study was initiated in 1982 in Peru to examine how to improve the interpretation of practical nutrition survey and surveillance indicators by assessing which simple, anthropometric indicators best measure fat stores and lean body mass in growth-stunted Peruvian children.

Food and Drug Administration (FDA)

In recent years the Department has developed a variety of U.S. policies on various international nutrition topics. One of the most important activities was the participation of the FDA and other DHHS representatives in the development of the *Codex Alimentarius,* a United Nations project to establish food standards for international trade. The FDA made a major contribution to the *Codex* in the area of foods for special dietary use. The U.S. position on the nutrient composition of infant formulas and on foods claimed to be beneficial for individuals with diabetes mellitus was largely accepted. In discussions with the Codex Secretariat in Rome the concept of food fortification has been introduced into the considerations of the *Codex*. In 1980 the *Codex* adopted a preliminary position on nutrition labeling that is consistent with current U.S. policy. Most recently, through representation in the Committee on Food Standards of the International Union of Nutritional Sciences, the FDA participated in establishing recommendations that nutritional aspects should be considered in the development of international standards and guidelines for foods.

The FDA also has provided consultation to the Agency for International Development, especially on matters of food safety and regulation. In 1982, for example, an agreement was signed with the AID which provides for FDA experts to assist the Tunisian National Institute of Nutrition and Food Technology with the conduct of a survey program to determine the frequency and levels of pesticide residue and heavy metal content of foods of importance in the Tunisian diet; to develop local skills in field inspection and surveillance, sampling, laboratory analysis, and evaluation of results to enable establishment of baseline data and development of programs to control food contamination problems identified in the survey.

Another international activity by the FDA is the official Tripartite relationship with Canada and the United Kingdom, where the agenda frequently covers nutrition subjects such as nutrition labeling and infant formulas.

Health Resources and Services Administration (HRSA)

Components of the HRSA have had a history of cooperation on international nutrition and nutrition-related studies, primarily in maternal and child health studies financed under the Special Foreign Currency Program. These have included studies of lactose intolerance in Egypt, low birth weight infants in Yugoslavia, and rickets in Poland. HRSA also has representatives on the two Task Forces concerned with breastfeeding and the implications of the Infant Formula Code for the United States. Additionally, U.S. technical consultation with UNICEF and service on the U.S. Delegation to the UNICEF Executive Board continues. UNICEF, in addition to the traditional strong emphasis on maternal and child health and nutrition, this year launched with WHO a new $10 million project concerned with nutrition. Consultation with the PHS will be facilitated by membership this year of a HRSA staff member on the WHO/UNICEF Joint Health Policy Committee.

National Institutes of Health (NIH)

The NIH supports international nutrition research and training through grants, contracts, and Special Foreign Currency Program project agreements. International nutrition activities of the NIH are facilitated through bilateral international agreements between the United States and various foreign governments.

At the NIH, international nutrition research and training is supported by the National Cancer Institute (NCI); National Heart, Lung, and Blood Institute (NHLBI); National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases (NIADDK); National Eye Institute (NEI); National Institute of Child Health and Human Development (NICHD); National Institute of Allergy and Infectious Diseases (NIAID); National Institute of Environmental Health Sciences (NIEHS); Fogarty International Center (FIC); and Division of Research Resources (DRR). NIH-supported nutrition research includes such subjects as protein-calorie malnutrition and its effect on enteric infections and immunocomponents, vitamin A deficiency, iron deficiency, the effects of malnutrition on fetal and infant development, and methods for maintaining hydration in adults with cholera and infants and children with severe forms of diarrhea.

Population change and migration often offers opportunities for research in the health sciences, including human nutrition. Diet is one contributor to the significant differences in the incidence of cardiovascular disease. Asian migrant populations offer a natural laboratory to study changes in dietary patterns. The NHLBI explored scientific opportunities in relationship to Pacific migrants in the "Workshop on the Changing Patterns in Cardiovascular Disease in the Pacific Basin." It was reported that "westernization" has resulted in conflicting patterns of cardiovascular disease in different countries. In the Philippines, for example, westernization, both in diet and customs, has been accompanied by an increased risk of coronary heart disease. In Japan, coronary heart disease is decreasing in spite of westernization and increased consumption of saturated fats.

Another study on the effects of westernization is being carried out by NICHD, in collaboration with the Ben Gurion University, Beer Sheva, Israel, among Bedouin populations who are undergoing transition from the nomadic to a more settled life. It is believed that, during the transition, exclusive breastfeeding of infants will give way to mixed breast and bottle feeding. Changes in infant feeding practices are being assessed by observing infant growth rate and morbidity.

National Center for Health Statistics (NCHS)

The National Center for Health Statistics is engaged internationally in studies which involve nutrition components. In Egypt, the NCHS has worked with the Ministry of Health in the development of a Health Profile of the Egyptian population. This project, which was initiated in 1977, involves three core activities—a Health Examination Survey, a Health Interview Survey, and a Health Facilities Inventory. In the Health Examination Survey, begun in 1981, the prevalence of conditions such as bilharzial infestation and malaria, nutritional deficiencies such as nutritional marasmus and avitaminosis; anemias; malignant neoplasms; hypertension; diabetes; and dental diseases are being assessed. In 1983, a new project was initiated in India with the National Institute of Nutrition in Hyderabad to study iron deficiency anemia in a rural population. An interest of the NCHS is analysis of the hematological parameters associated with iron status in the presence or iron deficiency, iron deficiency anemia, and other potential causes of anemia such as folacin deficiency and inflammatory disease. The availability of norms from other countries having differing genetic and cultural backgrounds could add valuable insights into how to interpret racial differences in measures of anemia in the United States.

Office of International Health (OIH)

The Office of International Health, OASH, serves, on behalf of the Surgeon General, as the principal coordinating agency for the Task Forces on Infant Formula and for coordinating U.S. positions on the International Code of Marketing of Breastmilk Substitutes.

The Office has a long-standing relationship with the Office of Nutrition of the Agency for International Development. Under the terms of an interagency agreement with the AID, the OIH has established an International Nutrition Unit (INU). The INU focuses on special analyses and provision of technical assistance to AID-assisted countries to promote the integration of nutrition interventions into primary health care programs. During 1982, the INU focused its efforts on several sub-Saharan African countries and the Caribbean. Recent publications include: *Nutrition Components of AID-Supported Primary Health Care Projects in Sub-Saharan Africa: A Review and Recommendations for a Nutrition Strategy; Nutrition and Primary Health Care: The State-of-the-Art;* and *Nutritional Problems in AID-Assisted Sub-Saharan African Countries: A Socio-Ecological Classification of Target Groups.* Additionally, the INU developed *Guidelines for Designing Nutrition Components of Primary Health Care and Related Development Projects* to be used by health and development officers in AID's Africa Bureau and its Missions in Africa.

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